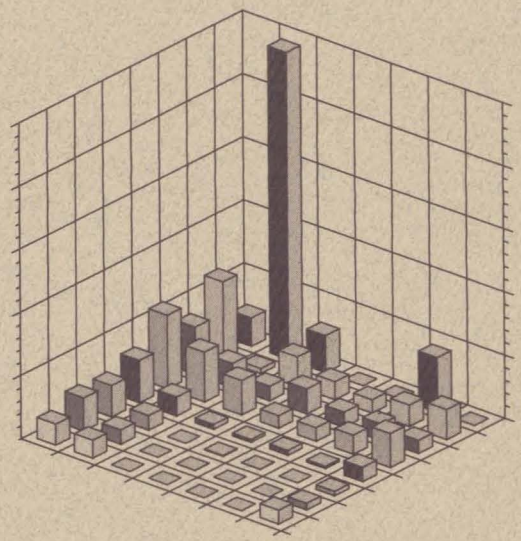
Trade Centers of the Upper Midwest: Changes from 1960 to 1989



by: Thomas L. Anding, John S. Adams, William Casey, Sandra de Montille, and Miriam Goldfein

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This report was funded in part by the Rural Economic Policy Program of the Aspen Institute and the Ford Foundation.

A publication of the Center for Urban and Regional Affairs, 330 Hubert H. Humphrey Center, 301 19th Avenue S., Minneapolis, Minnesota 55455.

1990

Publication No. CURA 90-12

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TO THE READER

What is there about the cultural landscape of the "heartland" of the United States that pulls one back, as the decade of the 1990s begins, to research questions of the 1960s? Why, after a long dormant period, are there stirrings of interest in multistate regional research and development? Is substate regional research and planning truly on the rise? The intellectual curiosity which lies behind these questions was part of the decision to do this work. Equally important were observations of growing stress in the economic and social fabric of this region. Disparities between the urban and rural communities, accentuated by continuing shocks to the farm economy, have produced debates not unlike those of the late 1950s and early 1960s. Yet substantial change has occurred since then in the relationship between rural populations and trade centers.

This work will only begin to supply answers to the complex questions being asked about the economy of the Upper Midwest in the 1990s. It will provide an improved profile of significant changes going on and it will create a potential base line for future measurement and study. The study of regional similarities and differences, to which this report makes a modest but, we hope, useful contribution, should contribute in a positive way to individual and collective decision making in the 1990s. A video summary of this report will also be available in January 1991.

Two additional research efforts are underway and will produce results in the coming months. A study of three subregions in the Upper Midwest—north-central Wisconsin, north-central Iowa, and southeast Montana—will be completed and published in early January 1991. A detailed look at change in the Twin Cities metro region between 1960 and 1989 will be completed in the summer of 1991. Both of these reports will provide a more detailed analysis of the changing role and functions of trade centers in the region.

No task as complicated and as resource demanding as this is ever done without major supporting efforts, both intellectual and financial. From the beginning, colleagues at CURA and elsewhere in the University of Minnesota have been extraordinarily supportive. The many voices of encouragement that were heard long before the study began are much appreciated. In particular, Thomas Scott and William Craig of the Center for Urban and Regional Affairs (CURA) and Barbara Lukermann of CURA and the Hubert H. Humphrey Institute of Public Affairs provided early and continuing advice and counsel. Professors John Fraser Hart and Russell Adams of the Department of Geography at the University of Minnesota contributed to early drafts of this report. The support staff at CURA, in particular Christine McKee and Louise Duncan, contributed greatly. Thomas Peek, former CURA researcher and currently a consultant on the development of a video summary of this project, made a major contribution to the structure of the final chapter in this report. CURA's editor, Judith Weir, provided substantial editorial assistance. Gregory Chu, from the Department of Geography's Cartography Laboratory, provided assistance on several maps. The participation of persons representing the seven states of the study area at a working paper review session in May of 1990 was very helpful. (See Appendix C for a list of participants.) In addition to financial support for the project, staff from the Aspen Institute provided a useful critique throughout the project. Most important of all has been the role of John Borchert in influencing the decision to do this work, providing both the historical basis on which this work rests and, with the publication of his *America's Northern Heartland*, a solid contemporary context for this work.

Thomas L. Anding

INTRODUCTION

The Upper Midwest Economic Study* of the early 1960s portrayed a regional economy in transition and a settlement system in flux. A lattice of trade areas and trade centers generated an economic flow that knit the region into a functioning whole. Since the time of those baseline studies there has been change in the organization of business and industry in the region. This study is a new portrait of the way the trade centers within the region are responding to long term trends. It is intended to help clarify for regional policy makers how national and international economic trends have affected the trade centers of the Upper Midwest during this thirty-year period.

The geographic distribution of retail and service businesses adjusts to the distribution of consumer purchasing power. Since 1960, the residence and character of consumers has changed (the demand side) and so have the economies and technologies of retailing goods and services (the supply side). The communication and transportation sectors have also experienced a transformation. Some sectors of the economy have grown in their share of regional economic activity while others, notably wholesaling and retailing, have shrunk. Since 1960, the interstate highway system has been completed and major regional highways have been upgraded. People now travel farther to work and to shop. This means that some retail sales have moved to larger centers, but also that paychecks are brought back home to areas served by lower-level retail centers.

The present system of *central places*** serving the Upper Midwest organizes the economy of the region. One Upper Midwest Economic Study report*** defined the system of central places operating in 1960 in the Ninth Federal Reserve District (Upper Peninsula of Michigan, Minnesota, Montana, North Dakota, South Dakota, and the northwestern half of Wisconsin). That report also described wholesale and retail trade within that area. This report is similar for 1989, with two differences. First, the study area has been changed to include seven entire states (Figure 0.1). The Upper Peninsula of Michigan has been dropped, the entire state of Wisconsin has been included, and Iowa and Nebraska have been added. Second, data on business establishments have been expanded beyond the wholesale and retail sectors to include agricultural services, construction, manufacturers, transportation and communication, banks, and services. The classification system developed in the Borchert and Adams report, which identified eight levels of trade centers, has been kept. This study also uses data from Dun and Bradstreet. The data were compiled by zip code boundaries. For 1960 we used data published by Dun and Bradstreet in January, 1960, as did the Borchert-Adams study. For 1989 we used data tapes that came directly from Dun and Bradstreet in July, 1989. The details of how the data were assembled and prepared are in Appendix A of this report.

Chapter 1 presents an overall picture of the Upper Midwest as it is today.

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* That study, under the aegis of the Upper Midwest Research Development Council and supported by a grant from the Ford Foundation, prepared nine study papers, eight urban reports, eleven technical papers, and a final report published by the University of Minnesota Press in 1965: *National Growth and Economic Change in the Upper Midwest* by James M. Henderson and Anne O. Krueger.

** A *central place* is a town or city or other urban place that serves as the trade and service center for a surrounding region.

*** *Trade Centers and Trade Areas of the Upper Midwest*, John R. Borchert and Russell B. Adams. Urban Report Number 3. Upper Midwest Economic Study. Minneapolis: Upper Midwest Research and Development Council. September 1963.

Figure 0.1 The Upper Midwest Study Area

Chapter 2 describes the hierarchy of trade centers in 1960. Chapter 3 examines the hierarchy of trade centers in 1989 and the changes in economic patterns between 1960 and 1989. Chapter 4 looks at business establishments in the Upper Midwest and changes in the mix of business establishments within trade center classes and by state. And Chapter 5 synthesizes conclusions and policy implications of the study, incorporating the results of a conference held in late May 1990, where these data were first presented to representatives of each of the states covered in the study.

CHAPTER 1. THE UPPER MIDWEST TODAY

The Upper Midwest encompasses 15 percent of the total land area of the United States and 6.4 percent of the nation's population. It is one of the most sparsely populated regions of the nation, with only twenty-eight persons per square mile.

Population

The most striking recent population shift in the United States has been the migration of people from the frostbelt to the sunbelt. The seven states of the Upper Midwest increased in population but lost rank between 1960 and 1987. Wisconsin, the most heavily populated state, slipped from fifteenth in 1960 to seventeenth in 1987. North Dakota, the least populated, dropped from forty-fourth in 1960 to forty-sixth in 1987. Examining the figures by decade reveals that two states lost population in the 1960s and Iowa lost population in the 1980s (Table 1.1). Furthermore, growth rates were not uniform.

Between 1980 and 1987 the Upper Midwest states (except for Iowa) grew faster than the average growth rate for the Midwest* as a whole (Figure 1.1). Midwest population growth of 1.1 percent was the lowest of any region in the United States for those years.

Since the turn of the century, jobs have shifted away from farms and small trade centers to larger urban centers. By 1960 the Dakotas, the last of the predominantly rural Midwest states, began to urbanize rapidly. From 1960 to 1987, South Dakota had the most rapid population growth in metropolitan areas of the states in the Upper Midwest. In contrast, only one in four Montana residents lived in metropolitan areas in 1987 after a growth rate of just 1.7 percent since 1960 (Figure 1.2).

Table 1.1 Population in the Upper Midwest, 1960-1987 (in thousands)

	1960	1970	1980	1987
Wisconsin	3,952	4,418	4,706	4,807
Minnesota	3,414	3,806	4,076	4,246
Iowa	2,758	2,825	2,914	2,834
North Dakota	632	618	653	679
South Dakota	681	666	691	709
Nebraska	1,411	1,485	1,570	1,570
Montana	675	694	787	809
	13,523	*14,512*	*15,397*	*15,654*

Source: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States 1989, p. 18, Table 22.

There are fewer cities and the population is less urbanized in the Midwest than in the Northeast and West. Population densities within the seven-state area vary from 5.6 persons per square mile in Montana, 9.3 in South Dakota, and 9.7 in North Dakota, to 20.8 in Nebraska, and on to 50.6 in Iowa, 53.4 in Minnesota, and a high of 88.3 persons per square mile in Wisconsin.**

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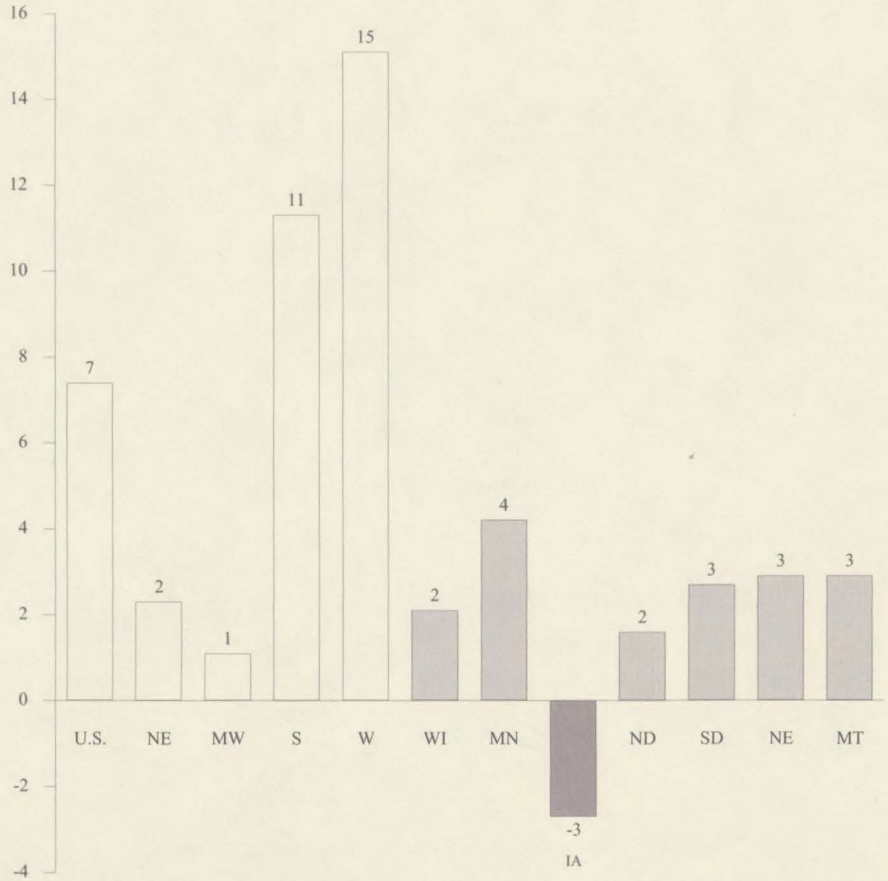
* Defined by the United States Census as Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

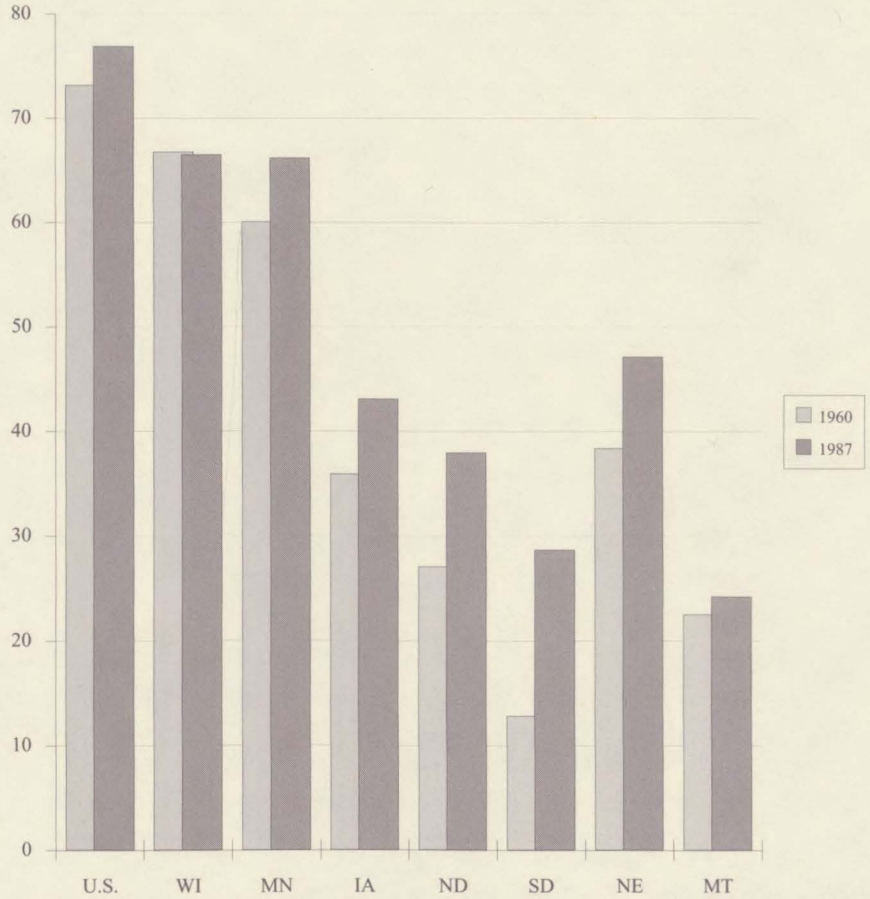
** Figures are calculated for 1987 from *Statistical Abstract for the United States, 1989*, p. 22, Table 27 and p. 192, Table 331.

Figure 1.1 Population Change, 1980-1987 (in percents)



Source: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, 1989, p. 21, Table 26.

Figure 1.2 Population in Metropolitan Areas, 1960 and 1987 (in percents)



Source: U.S. Department of Commerce, Bureau of the Census, "Statistical Abstract of the United States," 1982-1983, p. 16, Table 19, p. 10, Table 12; 1989, p. 28, Table 35.

Age

Two striking demographic trends have emerged in the United States since the 1960s. The birth rate has declined and the population is aging. In 1960 each state in the Upper Midwest had roughly 10 percent more people under the age of 18 than did the nation as a whole (Table 1.2). By 1987 the proportion of people under 18 in each state had fallen to approximately the national average of 26 percent.

Table 1.2 Population under the Age of 18 (in percents)

	1960	1987
Wisconsin	39.3	26.4
Minnesota	40.2	26.2
Iowa	38.5	26.1
North Dakota	42.9	27.8
South Dakota	41.1	27.6
Nebraska	37.9	26.6
Montana	41.2	27.8
United States	28.1	26.1

Source: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States 1964, p. 23, Table 18; 1989, p. 22, Table 27.

The population over 65 increased in the nation from 9.2 percent to 12.2 percent (Table 1.3). In the Upper Midwest in 1987 all states had proportions of elderly above the national average, ranging from 12.5 percent in Montana to 14.8 percent in Iowa. The graying of the population means an increased dependency on health care and more income transfers into these states in social security payments and pensions. These transfer payments influence personal disposable income and spending patterns but are difficult to incorporate into an economic analysis and projections for the region.

Income

Per capita income in constant dollars grew in the Upper Midwest by an average of 70 percent between 1960 and 1987, a rate slightly below the national growth of 73 percent (Table 1.4). The most striking increase was in Minnesota (90 percent), which enjoyed healthy growth both in income and in population. North

Table 1.3 Population over the Age of 65 (in percents)

	1960	1987
Wisconsin	10.2	13.2
Minnesota	10.4	12.6
Iowa	11.9	14.8
North Dakota	9.3	13.2
South Dakota	10.6	14.0
Nebraska	11.6	13.8
Montana	9.6	12.5
United States	9.2	12.2

Source: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States 1964, p. 23, Table 18; 1989, p. 22, Table 27.

Dakota also had a high rate of income growth (84 percent) but North Dakota's 1960 per capita income was unusually low. By 1987 its per capita income was still lower than both the national and regional averages.

Iowa, Nebraska, South Dakota, and Wisconsin all grew at rates between 60 and 69 percent. South Dakota's growth of 69 percent was impressive, but it started the period with the second lowest per capita income in the region in 1960. Despite the high growth rate, South Dakota was left with the second

Table 1.4 Per Capita Income (constant 1982 dollars)

	1960	1987	Growth (percents)
Wisconsin	7,287	12,336	69
Minnesota	7,007	13,328	90
Iowa	7,439	11,913	60
North Dakota	5,909	10,882	84
South Dakota	6,233	10,502	69
Nebraska	7,193	11,990	67
Montana	6,770	10,332	53
United States	7,490	12,955	73

Source: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States 1964, p. 329, Table 446; 1989, p. 433, Table 706.

lowest per capita income in the region in 1987. Iowa's per capita income was the highest in the region in 1960 and at about the national average, but dropped to a figure 8 percent below the national average in 1987.

Employment

The most striking change in employment in the Upper Midwest has been the growth in service industries, particularly those serving businesses and the computer industry. Minnesota had the highest growth of employment in service industries with 203 percent, followed by Wisconsin at 180 percent (Table 1.5). Both states have areas of high economic growth and high population density. The Dakotas also were dominated by growth in the service sector despite their small population base. This may be the result of a relatively undeveloped service sector in the Dakotas in 1960, which grew along with the rapid urbanization during the study period.

Jobs in finance, insurance, and real estate grew at a median rate of 105 percent between 1960 and 1984. The slow growth of wholesale and retail employment compared with services reflects changing structures and marketing procedures rather than a slowing in the sector's growth as a whole. The robust retail growth figure for Minnesota reflects its growing role as a regional shopping center and comes mostly from the Twin Cities' metropolitan area. Manufacturing growth varies widely across the seven states, reflecting variations in the economic base of each state. Minnesota's strong showing on a substantial base and the Dakotas' high percentage increases over a small base are worth noting.

Table 1.5 Change in Employment by Standard Industrial Classification, 1960-1984 (in percents)

	Con-struction	Manu-factures	Trans-portation	Whole-sale	Retail	FIRE†	Services
Wisconsin	4	12	20	86.06*		124	180
Minnesota	23	63	15	72	102	105	203
Iowa	1	19	-5	72	55	95	143
North Dakota	42	138	28	117	68	118	176
South Dakota	-22	118	19	86	29	134	170
Nebraska	-2	33	14	98	63	91	144
Montana	15	9	8	102	85	94	159

† Fire, Insurance, and Real Estate

* Combined wholesale and retail

Source: U.S. Department of Labor, Supplement to Employment Hours and Earnings, States and Areas, 1985, pp. 117, 172, 187, 188, 246, 311, 368; 1975, pp. 263, 373, 403, 410, 541, 666, 762.

CHAPTER 2. THE HIERARCHY OF TRADE CENTERS IN THE UPPER MIDWEST IN 1960

In studying the economy of the Upper Midwest in 1960, John Borchert and Russell Adams* examined the extent of retail and wholesale trade occurring in central places in the region. They were able to classify the entire trade structure of the area into a hierarchy of centers based on the types of businesses and a measure of sales volume. Each central place—such as a village, city, or metro area—formed a trade center at some level in the hierarchy. The hierarchy consisted of eight levels, with the metropolitan Minneapolis-St. Paul area classified as the highest level of trade center in the system. Two additional levels of trade centers marked by distinctive mixtures of both wholesale and retail activity were identified: primary wholesale-retail and secondary wholesale-retail centers. The other five levels in the trade hierarchy had progressively decreasing amounts of retail activity and are classified as complete shopping centers, partial shopping centers, full convenience centers, minimum convenience centers, and hamlets.

Trade Centers

There were nearly 2,000 **hamlets**, the lowest level of the hierarchy, in 1960. They were somewhat disparate in the businesses they housed. However, virtually all of them included a gas station and a cafe along with a grocery store. The foundation of the central place hierarchy was the small cluster of businesses that comprised the **minimum convenience center**, i.e., a restaurant, bank, hardware store, drug store, grocery store, and gas station. Minimum convenience centers supplied frequently purchased items and services but contained few, if any, specialty outlets other than sellers of certain farm needs.

Full convenience centers were distinguished by the addition of: a household appliance or furniture store, a jewelry store, a laundromat or dry cleaner, and a department store or men's or women's clothing store. Also, they included at least three other specialty stores, such as a shoe store, a lumber yard, a funeral parlor, a hotel, or a farm and garden supply center.

Trade centers at higher levels in the hierarchy were defined by additions of still more specialized stores and shops: photographic studios, sporting goods, florists, music stores, children's wear, heating and plumbing equipment, stationery, and antiques. The **partial shopping center** had four to eight of these specialized shops. The **complete shopping center** had nine or more.

Wholesale activity was usually present to some degree at convenience centers and larger places. Wholesaling of auto supplies and bulk oil was the most widespread. Fourteen different classes of wholesale activity were used to assess a center's rank as a wholesale-retail trade center: auto supplies, bulk oil, chemicals and paint, dry goods and apparel, electrical supplies, groceries, hardware, industrial-farm machinery, plumbing-heating-air conditioning, professional service equipment, paper, liquor, drugs, and lumber and construction materials. A **primary wholesale-retail center** featured all of these functions and contained over a hundred wholesale businesses. A **secondary wholesale-**

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* *Trade Centers and Trade Areas of the Upper Midwest*, Urban Report Number 3. Upper Midwest Economic Study. Minneapolis: Upper Midwest Research and Development Council, September 1963. This chapter is essentially a summary of the findings and conclusions presented in the 1963 report.

retail center had ten to thirteen of these functions and featured more than fifty wholesale businesses. There were eighteen of these wholesale-retail centers, either primary or secondary, with the biggest of them, the Twin Cities, holding a unique position as the metropolitan center and economic capital of the entire Upper Midwest.

In the Borchert-Adams study there were seventy-five complete shopping centers in the Ninth Federal Reserve District. In addition, the seventeen primary or secondary wholesale-retail centers, plus the Twin Cities metropolis, had all of the functions of the complete shopping centers. Thus, there were ninety-three complete shopping centers in all.

The size of trade areas and the spacing of trade centers depended mainly on rural population densities prior to 1960. Complete shopping centers were closest together and trade areas most compact in southern Minnesota. In the forest regions of northern Minnesota, northwestern Wisconsin, and Upper Michigan around Lake Superior, the centers were farther apart and their trade areas larger. The widest separations between centers and the most extensive trade areas occurred in the low density ranching area of the Great Plains in Montana and the western Dakotas.

The Borchert-Adams study noted that in 1960 large shopping centers were increasing their penetration of their trade areas, which lowered the retail strength of the small outlying centers. Further, retail sales were growing at a rate far below that of personal income, with a rapidly rising share of personal income going to public and private services. As a result, retail sales at complete shopping centers seemed to increase slowly compared with other parts of the economy, even though these centers were increasing their shares of the trade area market.

One main trend emerged from the 1960 data in regard to wholesale trade. The Twin Cities metropolis accounted for a large share of the growth of wholesale buying power in the metro trade area. A growing share of Twin Cities wholesaling was aimed at the local Twin Cities market.

The Overall Economic Picture in 1960

The changing geographic pattern of Upper Midwest trade centers and trade areas in 1960 reflected basic economic changes. Six points were emphasized by Borchert and Adams because of their implications for local community leadership, planning, and action.

1. The ninety-three regions defined and analyzed in terms of their wholesale and retail functions were more than simple trade areas. Each was a complex economic-geographic system that provided a framework for cooperative planning and building.
2. Secondary wholesale-retail centers and some primary wholesale-retail centers were increasing their importance in regional retail and service trade for both their own residents and increasingly wide trade areas.
3. The relative decline of retail buying power in personal expenditure suggested that new downtown investments would have to come increasingly from non-retail enterprises and from public agencies.
4. Small convenience centers in farm areas were static but not declining. They were in viable business locations for the purposes they served and deserved to be maintained, replaced, and modernized. Centers with overdeveloped business districts needed to be downscaled and cleared of obsolete structures.
5. The shopping trade centers as a whole accounted for almost all of the regional economic growth. Due to their differing rates of growth, a reordering of their ranking was possible.
6. The location of competing centers, of national markets, and of productive agricultural regions had been, and was expected to be, a continuing important factor in trade center growth. But close study of the centers and their individual performances revealed that much of the variation from place to place was the result of individual and community initiative.

Borchert and Adams predicted that these factors would be at least as great in the future as they had been in the past.

CHAPTER 3. UPPER MIDWEST TRADE CENTERS IN 1989 AND HOW THEY COMPARE WITH 1960

The aim of this chapter is to analyze the current pattern of trade centers in the Upper Midwest and to compare these centers' spatial distribution and economic profile in 1989 with that in 1960. The analysis and longitudinal comparison are accomplished using a number of different measures. It is important to understand that this study examines only two discrete points in time, namely 1960 and 1989. What we can determine from this analysis is how the region currently looks and how it has changed in the past thirty years in terms of the number and types of business establishments it supports.

Methodology

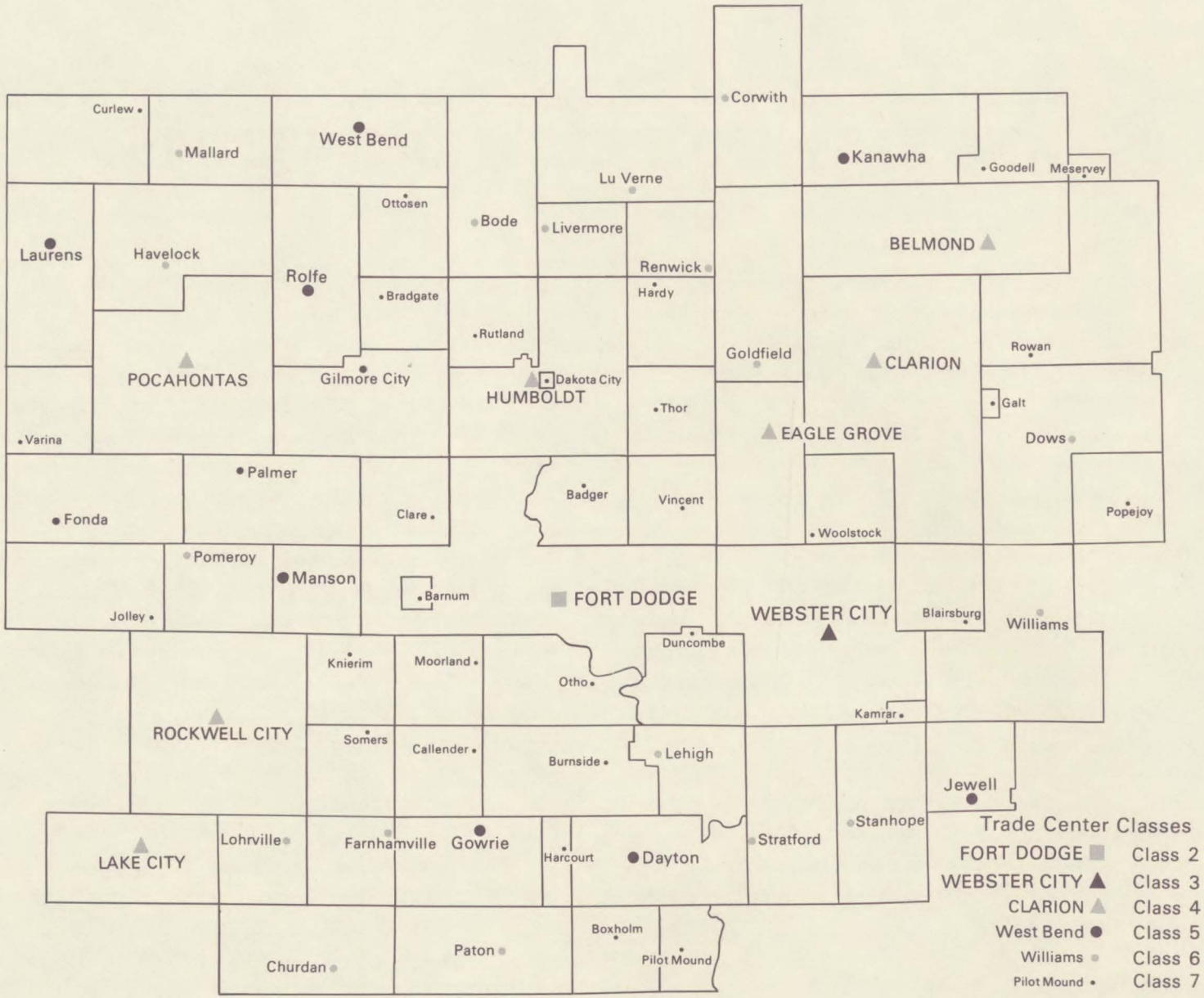
This study of changes in trade centers and their economic activities during the last three decades began by collecting and analyzing data using the Borchert-Adams central place framework described in Chapter 2. Dun and Bradstreet data provided information about the number of business establishments at each location as well as other economic measures. As compared with the Borchert-Adams study, which examined only retail and wholesale activity, the data base was expanded to include construction, manufacturing, services, and other industry categories so that a more complete picture of the economic structure of the region could be provided. The Dun and Bradstreet data are organized by zip code; each zip code area serves as a surrogate for a central place in our study. This method is credible given that throughout the sparsely populated portions of the Upper Midwest most business activity occurs in towns in which post offices are located.

Data for some industrial categories were eliminated from our study because it was impossible to compare the years 1960 and 1989. These were mostly categories for which Dun and Bradstreet did not collect much or any credit data thirty years ago, but for which coverage today is more extensive. These categories include medical services, legal services, educational services, and social services. A more detailed explanation of the preparation of the data is given in Appendix A along with a complete list of the reductions made (Table A.6). As part of the verification process, an analysis of the entire 1989 data set was made to determine if its characteristics were markedly different because of these reductions. This process is presented in Appendix B. Differences were found to be negligible at all levels of the trade center hierarchy.

The research process produced a high degree of confidence that the Dun and Bradstreet data accurately reflect the reality of trade center patterns throughout the study region and their change over the twenty-nine year period. Thoroughness of coverage as well as accuracy of the data were examined by comparing Dun and Bradstreet data with data from other sources: statistics in *County Business Patterns*, from the Bureau of the Census; state sales tax listings; Chamber of Commerce membership lists; and trade group rosters. No data set—including Dun and Bradstreet—is perfect, but in all instances the quality of the Dun and Bradstreet data compared favorably with that from other sources. Appendix B explains the steps followed in comparing the different data sets.

After these preliminary assessments of the Dun and Bradstreet data were made, the entire data set was examined to see if it agreed with the trade center breakdown detailed in the Borchert-Adams study. To determine this, a means of scoring central places using the 1960 expanded Dun and Bradstreet data base and then assigning them to their respective levels in the region's central place hierarchy was developed (see Appendix A). This method proved to be reliable

Figure 3.1 Spatial Distribution of the Trade Center Hierarchy in North-Central Iowa



in reproducing the Borchert and Adams 1960 hierarchy. Having accomplished this, states in the present study that were not included in the 1960 study (Iowa, Nebraska, and part of Wisconsin) were examined using the same scoring algorithm. The result was a reconstructed 1960 trade center pattern congruent with the Borchert-Adams study but based on a wider number of commercial activities and covering additional states.

The trade center hierarchy defined by the Borchert-Adams study was borrowed intact for the present study even though an expanded data base and different methods were used in its determination (Table 3.1). Because more than just retail and wholesale sales data were employed, the names for two levels of the hierarchy are slightly modified. The rest of the hierarchy names are the same. Both labels, the descriptive title of the center and its corresponding level number, will be used interchangeably throughout the report. An example of the actual spatial distribution of this hierarchy is shown in Figure 3.1. This map shows a portion of north-central Iowa and its major city Fort Dodge, a secondary regional center.

The second major portion of the data analysis examined the business establishment profile of each place for 1989 and evaluated its change using scoring methods similar to those developed for the 1960 data. Cities whose economic bases expanded in absolute or relative terms could be distinguished from those that remained stable or declined. Exceptionally strong growth caused some places to move up in the hierarchy while others dropped down a level. Less that 10 percent of the places evaluated changed trade center levels within the hierarchy, but many more shifted within their particular trade center level. For example, Oshkosh, Wisconsin had dropped a class level by 1989 to become a secondary regional center and Waukesha, Wisconsin had moved up a level to become a primary regional center. In contrast, Lead, South Dakota and Owatonna, Minnesota were average complete shopping centers in 1960 and in 1989 remained classified as complete shopping centers. However, Owatonna had moved up within that class and was above average in terms of number of establishments in eight out of the ten industry categories, whereas Lead had moved down within its class and was below average in four out of the ten industry categories.

Table 3.1 Trade Center Hierarchies Compared, 1960 and 1989

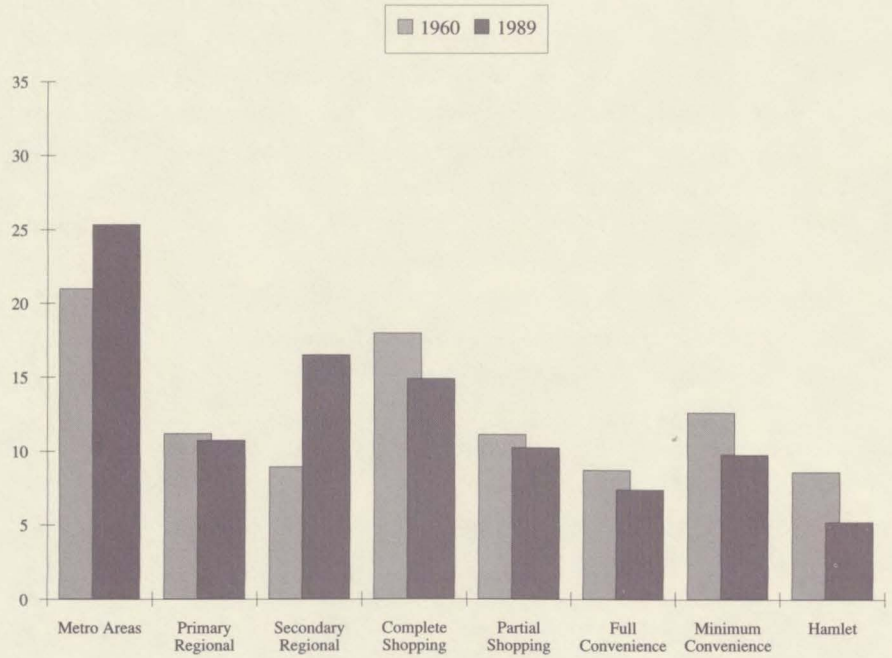
1960 Borchert-Adams Trade Center Class Name	Level	1989 Present Study Trade Center Class Name
Metro Area	0	Metro Areas
Primary Retail-Wholesale	1	Primary Regional
Secondary Retail-Wholesale	2	Secondary Regional
Complete Shopping	3	Complete Shopping
Partial Shopping	4	Partial Shopping
Full Convenience	5	Full Convenience
Minimum Convenience	6	Minimum Convenience
Hamlet	7	Hamlet

Spatial Distribution in 1989

Trade centers in the Upper Midwest in 1989 remain situated much as they were in 1960. The geographic structure of the trade center system has shown exceptional stability as measured by our classification scheme. This is not to say that towns today look as they did in 1960. The mix of establishments within towns of a certain class has changed (see Chapter 4), but most towns that were classified as minimum convenience centers in 1960 remain classified as minimum convenience centers in 1989. Except for some change at the top, differences are few and relatively modest.

The growth in the system, however, has been unevenly distributed. The biggest trade centers have captured the largest share of the total growth, so that much more economic activity occurs in the upper levels of the trade center hierarchy in 1989 than in 1960, while trade in the lower levels of the hierarchy has declined. In essence, the hierarchy itself has shifted. There are more businesses in 1989 at every level of the hierarchy, except in the hamlets, but the bulk of the gain has gone to the top three trade center levels, while the levels from complete shopping centers down to hamlets have decreased in their share of businesses (Figure 3.2). The decrease was most dramatic in the hamlets, which lost almost half of the share of businesses they commanded in 1960. The four metro centers gained, as did the sixty secondary regional trade centers.

Figure 3.2 Change in Distribution of Business Establishments in All Industry Categories, 1960-1989 (in percents)



The same pattern holds true when industry categories are examined separately. In fact, the increases and decreases were more dramatic in retail establishments (Figure 3.3). Minimum convenience centers and hamlets declined substantially, from 24 percent in 1960 to 15 percent by 1989. Though the metro centers gained in their share of retail establishments, that growth pales by comparison with the secondary regional centers, which more than doubled their share, from 8 percent in 1960 to 18 percent in 1989. More movement occurred between trade center classes in the retail sector than in any other sector. The "malling" of America and increases in retail shopping outlets provide some explanation for these changes in both the function and location of retail trade.

In the service sector, metro centers, primary regional centers, and secondary regional centers increased their share of service establishments from 42 percent in 1960 to 62 percent in 1989 (Figure 3.4). The metro areas accounted for over half of this growth. Trade centers at levels 3 through 7 lost between 3 percent and 5 percent of their share of the total number of service establishments. The pattern is duplicated in the transportation and communications sector as well (Figure 3.5). In 1960 complete shopping centers and minimum convenience centers both had a higher proportion of transportation and communications establishments than the metro centers. By 1989, however, centers at both these levels had declined in their shares while the metro centers had captured 20 percent of the establishments and secondary regional centers commanded 17 percent.

In essence, two trade center levels—the metro centers and the secondary regional centers—stand out in this analysis. They have increased their shares of business activity in nearly all industry categories. The increase has come at the expense of the lower level centers (levels 3 through 7) which have experienced decreases across all industry categories, with few exceptions. The shift in the hierarchy over the past thirty years reflects changes in the function of trade centers at all levels.

Figure 3.3 Change in Distribution of Retail Establishments, 1960-1989 (in percents)

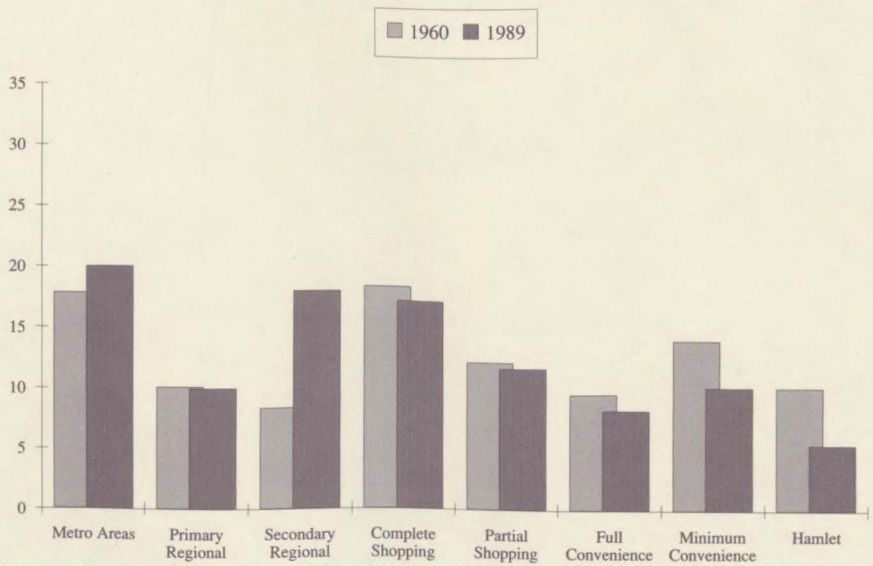
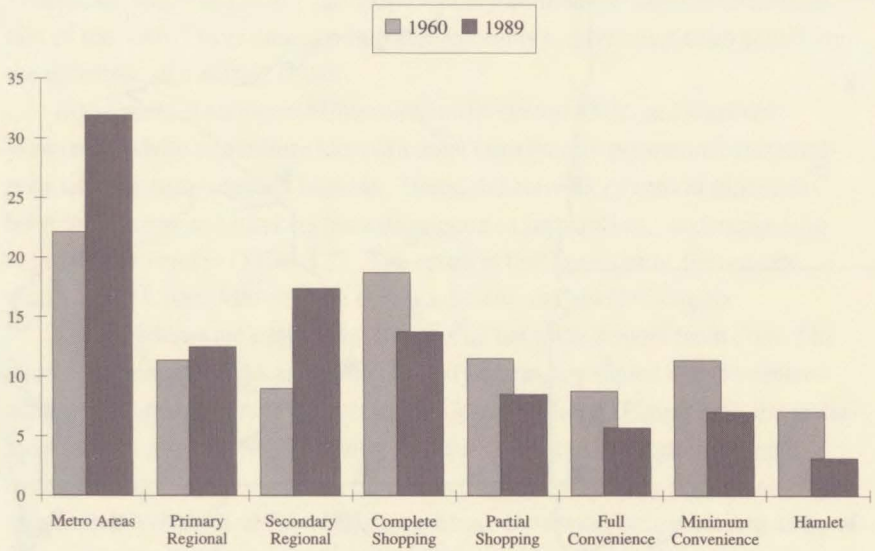


Figure 3.4 Change in Distribution of Service Establishments, 1960-1989 (in percents)



The Twin Cities metropolitan area remains the undisputed regional capital, linking the Upper Midwest to other national and international centers. There are three other metropolitan areas in the region: Des Moines, Milwaukee, and Omaha-Council Bluffs. These four areas make up the metropolitan trade center class. Each dominates a wide surrounding trade area from which it draws resources and purchasing power and to which it delivers economic leadership and specialized goods and services of almost every type.

The "marketing principle" from central place theory notes that lower order central places have their best chances for economic success at the margins of the trade areas of higher order centers. Milwaukee, Minneapolis-St. Paul, Des Moines and Omaha did just that to Chicago, growing up and thriving at the margins of Chicago's effective competitive reach during the days of railroading and throughout most of the 20th century. But smaller places located between the metro centers or remote from them can compete successfully with the metro centers according to the same principle.

Minneapolis-St. Paul confronts its level 1 trade center satellites—Duluth, Fargo, Sioux Falls, Billings—in the margins of its zone of dominance. Great Falls, which had been a level 1 trade center in 1960, failed to maintain its status and slipped to a level 2. Duluth-Superior is an interesting case. It rose to prominence early in the century with iron mining and lumber and grain shipping and then had a brief reprieve from economic doldrums following the completion of the St. Lawrence Seaway and during the taconite boom of the 1960s and 1970s. It has been stagnant during the 1980s. Yet, despite continuing economic hardship, it has maintained itself as a class 1 trade center.

Milwaukee's network of level 1 satellites includes Green Bay, Appleton, Madison, and Racine. All maintained their level 1 status between 1960 and 1989. Kenosha slipped down a level as its manufacturing base deteriorated. Appleton remained the class 1 trade center in the busy manufacturing and recreation-based regional economy around Lake Winnebago. Appleton's saturation of the sub-region in terms of the need for a primary regional center resulted in a

Figure 3.5 Change in Distribution of Transportation and Communications Establishments, 1960-1989 (in percents)

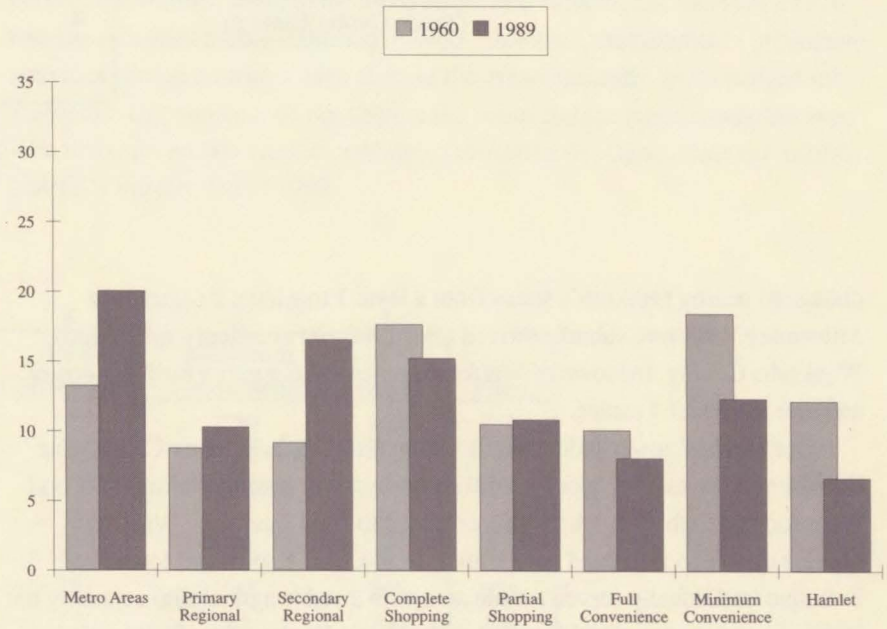
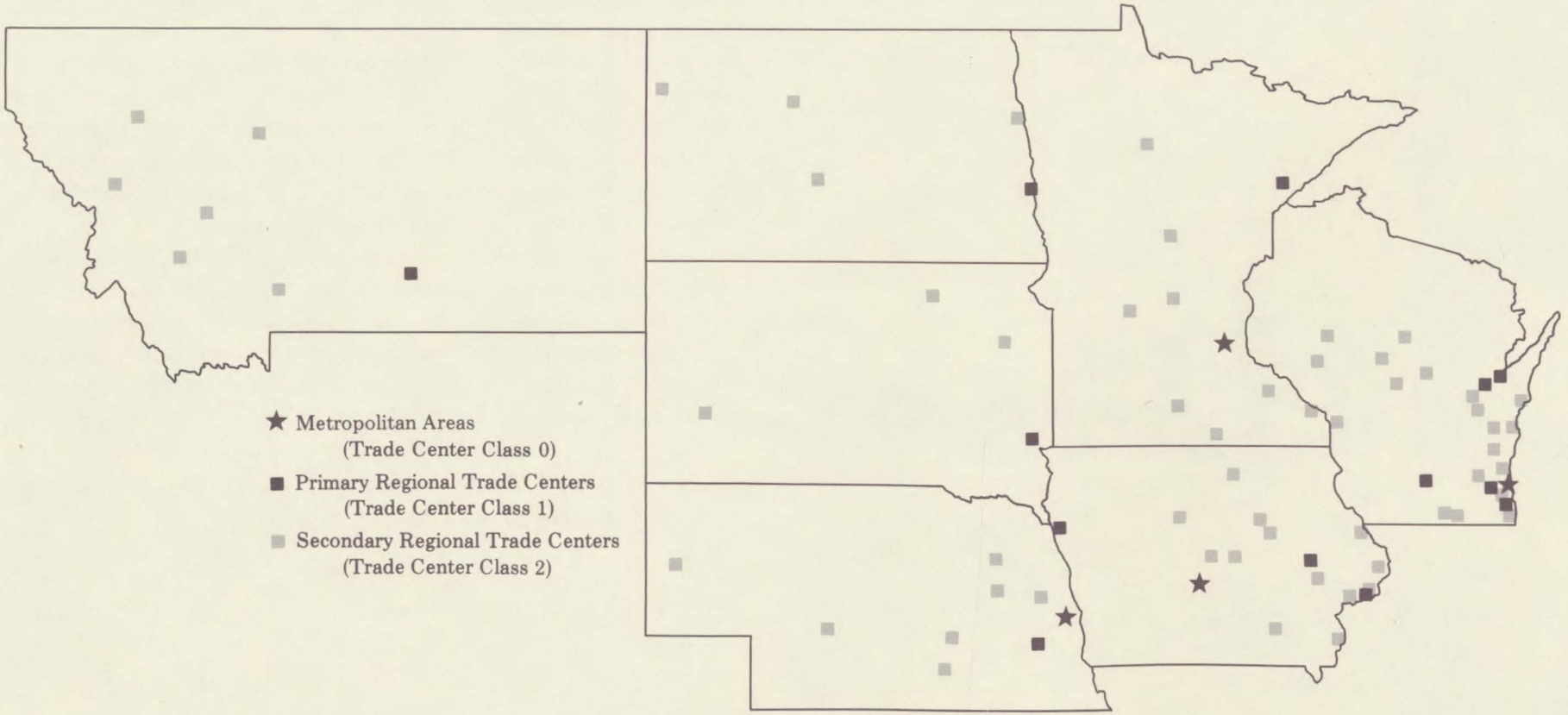


Figure 3.6 Major Trade Centers in the Upper Midwest, 1989



change of nearby Oshkosh's status from a level 1 to a level 2 center. As Milwaukee's western suburbs thrived after 1960 and eventually spilled into Waukesha County, the town of Waukesha emerged as a major business center and rose to a level 1 center.

Des Moines' lower order satellite competitors include Sioux City, Cedar Rapids, and Davenport, which held their trade center positions after 1960, and Waterloo and Dubuque, which slipped down to level 2 centers. Waterloo appears unable to withstand competition from Cedar Rapids and Iowa City; Dubuque traditionally served a trade area with a stable agricultural economy but in the last couple decades this base has declined. Furthermore, Dubuque was bypassed by the interstate highway system.

The bulk of Nebraska's population and purchasing power is in the eastern third of the state and Omaha easily maintains itself as the state's premier city. Its principal satellite, less than an hour's drive to the southwest, is Lincoln, whose major economic base is formed by the presence of the state capital and the University of Nebraska.

There are thirteen primary regional centers, classified as level 1 (Figure 3.6). Primary regional centers, along with the four metro centers, provide high order trade and service functions to major tributary areas as well as to their own resident populations. All but one of these seventeen major centers are located in

the eastern third of the region, near the eastern Dakota and Nebraska borders, or within the prosperous and more densely settled agricultural areas of Iowa, Minnesota, and Wisconsin. The extraordinary dominance and market penetration of the Twin Cities metropolitan area prevents nearby cities from achieving the eminence of a class 1 center.

In the parts of southern Minnesota, north-central Iowa, and southern Wisconsin where agriculture has been most consistently prosperous, the rural population density remains highest. There, the network of central places has been most dense and markets have developed to support large and expanding metropolitan centers (Table 3.2). The result is that three out of five central places in the Upper Midwest are in Iowa, Minnesota, and Wisconsin.

These patterns are easily seen in maps of the trade centers from class 2 to class 7. When one looks at the map of sixty secondary regional trade centers along with the major trade centers in the Upper Midwest (Figure 3.6), the settlement pattern and income generating abilities of various subregions emerge. Montana's sparse pattern stands out, reflecting its low density population. Sparsely settled Nebraska and the Dakotas manage to support only a modest array of centers. In the Iowa-Minnesota-Wisconsin area, centers are few both in the cool, forested and sparsely settled Lake Superior region and in the dry area of unreliable moisture in the southwest. The rugged driftless area of northeastern Iowa and southwestern Wisconsin also stands out as lacking in major centers, implying that there is neither the population nor economic base to support them.

The remaining maps in this set reveal, in turn, how complete and partial shopping centers (levels 3 and 4), full and minimum convenience centers (levels 5 and 6), and, finally, hamlets (level 7), fill in the Upper Midwest territory completely and serve all corners of the region with a full range of central place functions (Figures 3.7, 3.8, and 3.9).

To summarize, the high order centers of 1960 are largely those of 1989. A few lost rank as population and purchasing power eroded within their trade areas or as they were bypassed by the interstate highway system, or as they were superseded by nearby centers offering an expanding export employment base. But opposing the pressures on cities, there are some natural countervailing forces at work which promote a measure of stability in the central place system. When a place grows fast, congestion increases, labor may be scarce, prices rise, shortages occur, and government institutions and physical infrastructure are easily overtaxed in the short term. In stable or declining areas, land and buildings, although often old, are sometimes surprisingly inexpensive, physical infrastructure and institutions have unused capacity, and governments often are eager to be cooperative. Both of these sets of forces, described only in outline form here, slow down the overall pace of change, which is the same as promoting stability.

From the level of the thirteen primary regional centers such as Duluth, Fargo, and Billings, down to the more than 2,000 hamlets, the trade center system has remained highly stable since 1960. However, the patterns of productive activities carried on within each class of the urban hierarchy have changed substantially. Our numbers do not capture the boom and the bust periods, but even with these ups and downs the geographic picture of the Upper Midwest in 1989 generally mirrors that of 1960.

Table 3.2 Number of Central Places by State and Trade Center Class, 1989

	0	1	2	3	4	5	6	7	
	Metro Areas	**Primary Regional**	**Secondary Regional**	**Complete Shopping**	**Partial Shopping**	**Full Convenience**	**Minimum Convenience**	**Hamlet**	***Total***
Wisconsin	1	5	19	57	69	102	250	243	*746*
Minnesota	1	1	8	27	55	62	172	423	*749*
Iowa	1	3	13	40	73	117	299	374	*920*
North Dakota	0	1	4	5	11	16	64	282	*383*
South Dakota	0	1	3	11	17	16	78	238	*364*
Nebraska	1	1	7	14	34	57	144	267	*525*
Montana	0	1	6	13	16	17	42	209	*304*
	4	*13*	*60*	*167*	*275*	*387*	*1,049*	*2,036*	*3,991*

Figure 3.7 Complete and Partial Shopping Centers, 1989

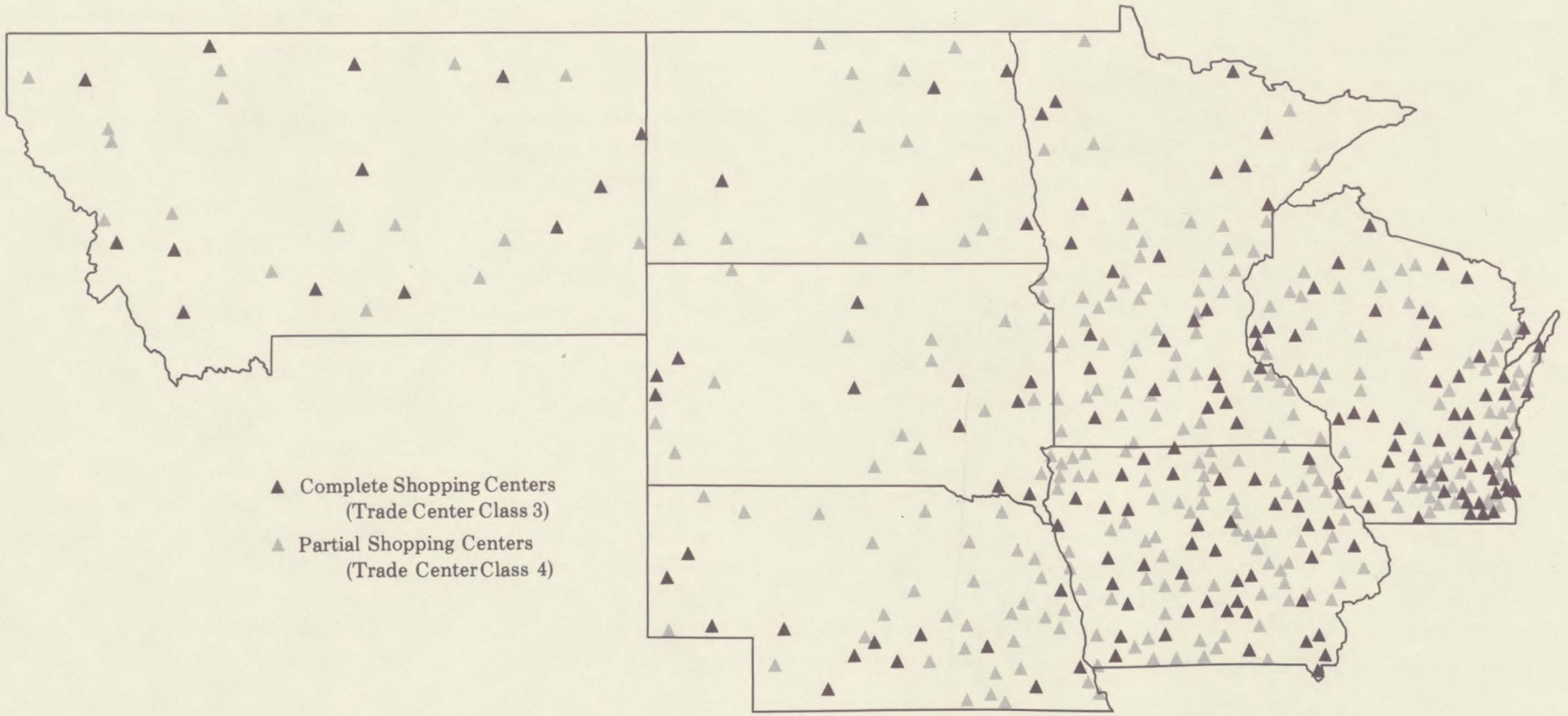


Figure 3.8 Full and Minimum Convenience Centers, 1989

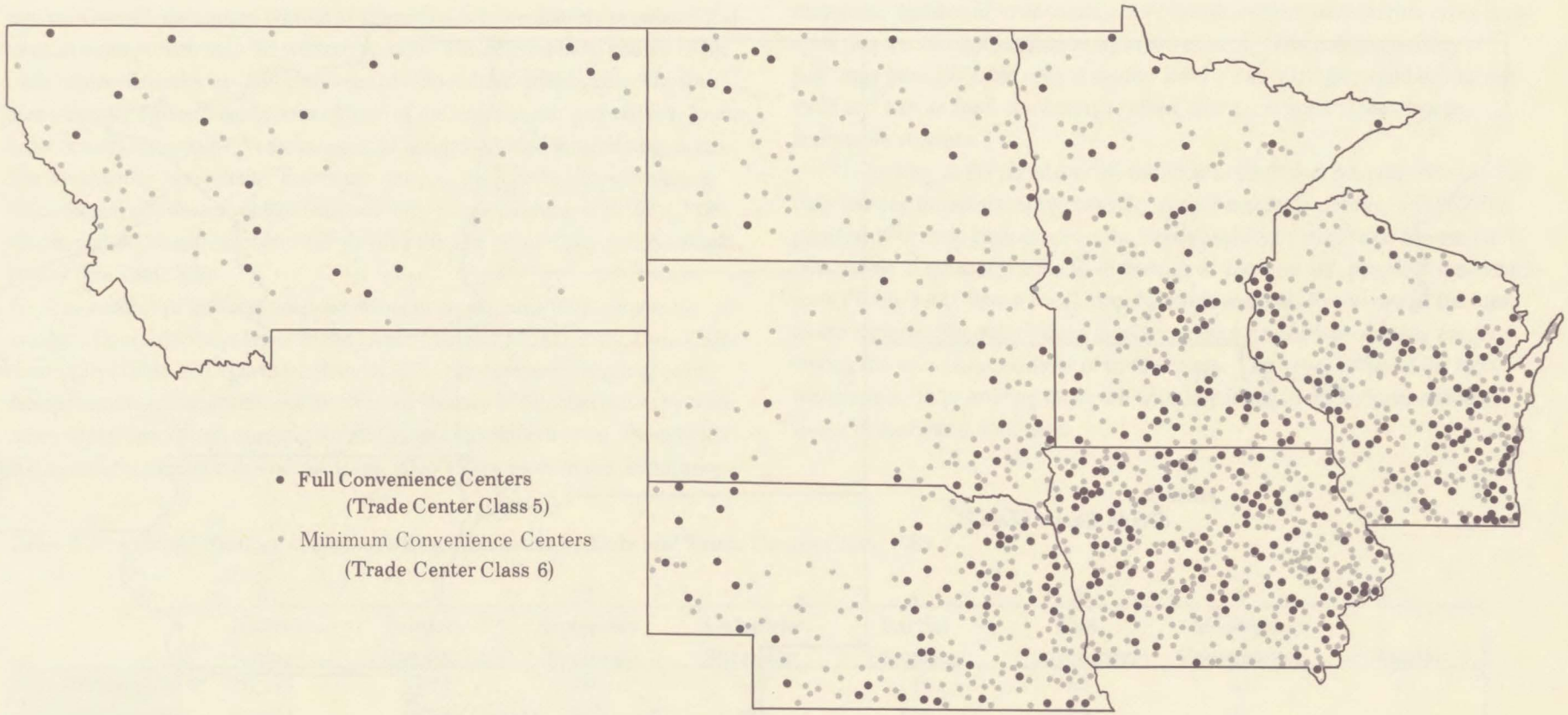
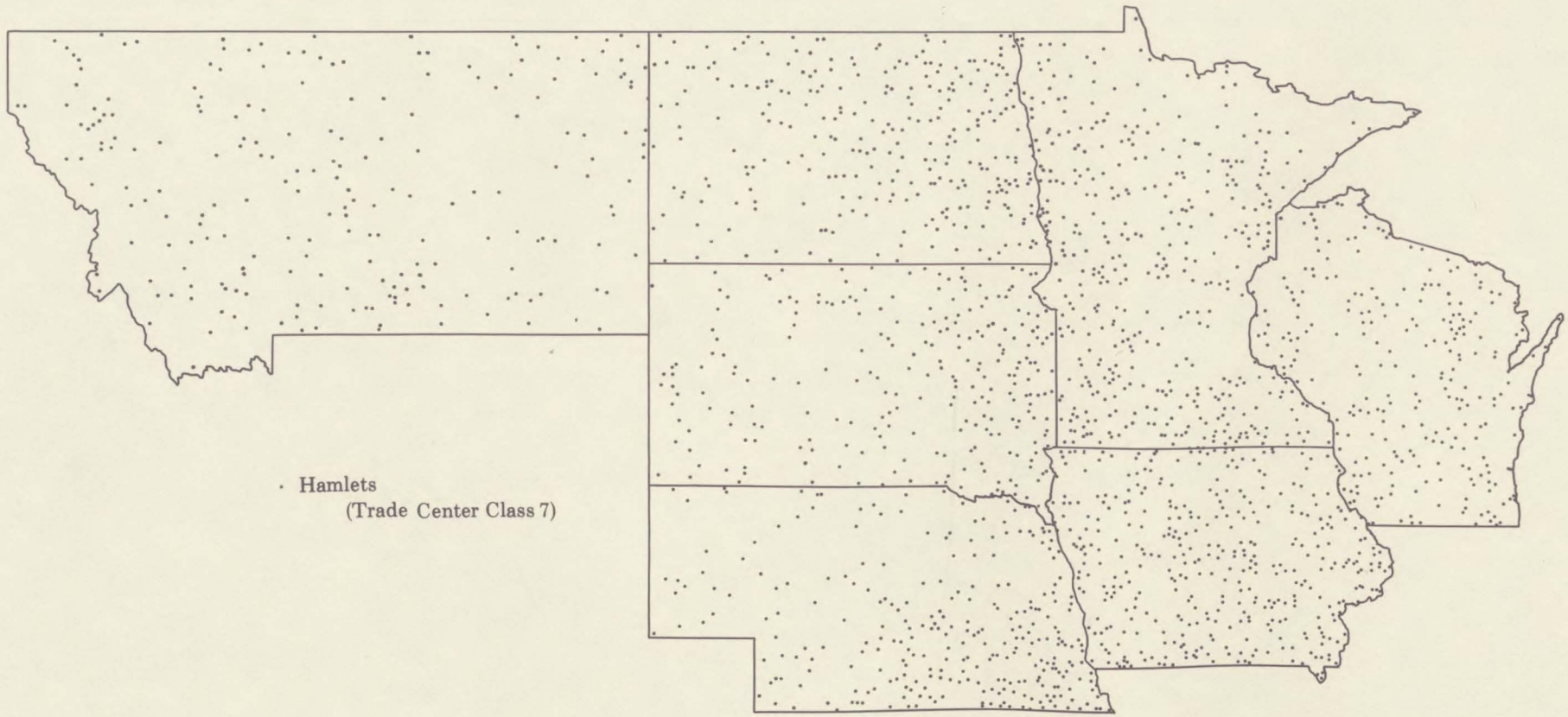


Figure 3.9 Hamlets, 1989



Overall Patterns in the Upper Midwest, 1989

In general, the density of population, level of economic activity, and number of central places decline from the north and east to the south and west within the region. Overall, the eastern portion of the region is more densely populated and has had more growth than the western portion. The geographical pattern of the trade center hierarchy in 1989 continues to reflect these differences. The four metro centers thrive in the eastern portion of the region, with successively lower order centers succeeding on the margins of competing higher order trade areas. The Twin Cities metro center dominates much of the eastern states, curtailing development of primary regional and secondary regional centers in Iowa, Minnesota, and Wisconsin to counts below what the size of their populations would predict (see Table 3.2).

The number of business establishments in the region's trade centers averages from a dozen or fewer in the hamlets to over 50,000 in the Twin Cities metropolis (Table 3.3). Up through the level of the complete shopping center there is reasonable uniformity in the average number of establishments by trade center class: about three dozen at the minimum convenience level, about twice that number at the full convenience level, up to 150 or more in the partial shopping center, and 300-400 establishments in the complete shopping center. The three states that lack metro centers (the Dakotas and Montana) have secondary regional centers that are much larger than average for their class. Probably a reasonable number of lower order centers are delivering some higher order functions that are normally delivered by metro centers. If these higher-order functions were available only at the few level 1 centers, they would be too scattered and remote from consumers to allow their provision to take place in acceptable volumes.

By looking at the population distribution in the Upper Midwest one can further describe the spatial arrangement of people and trade centers. In 1989, the population in trade centers across the Upper Midwest varied from almost a million people in the metro areas to an average of just over 600 people at the hamlet level (Table 3.4). One in four Upper Midwest residents live in one of the four metro regions. The rest of the region's residents are distributed fairly evenly among the seven lower classes of trade centers. The lower levels of the hierarchy appear to be holding their own with 35 percent of all regional residents living in the bottom four tiers.

Table 3.3 Average Number of Business Establishments by State and Trade Center Class, 1989

	0	1	2	3	4	5	6	7
	Metro Areas	Primary Regional	Secondary Regional	Complete Shopping	Partial Shopping	Full Convenience	Minimum Convenience	Hamlet
Wisconsin	20,955	3,271	998	344	155	84	41	12
Minnesota	52,861	3,228	993	397	147	89	45	13
Iowa	9,405	2,352	936	290	124	55	25	8
North Dakota	•	3,045	1,258	388	111	72	37	8
South Dakota	•	2,927	1,163	329	122	67	34	8
Nebraska	12,124	4,249	827	319	137	58	28	8
Montana	•	3,488	1,445	308	163	108	53	9

Table 3.4 Population by Trade Center Class, 1989

		Average Population	Total Population	% of Total
0	Metro areas	983,869	3,935,474	25
1	Primary regional	122,845	1,596,980	10
2	Secondary regional	41,512	2,490,740	16
3	Complete shopping	12,502	2,087,832	13
4	Partial shopping	5,132	1,411,324	9
5	Full convenience	2,748	1,063,641	7
6	Minimum convenience	1,636	1,716,312	11
7	Hamlet	627	1,275,740	8
			15,578,043	*100%*

Three of four regional residents (76 percent) lived in Iowa, Minnesota, or Wisconsin in 1989 (Table 3.5). The dominance of the three eastern states reflects the quality of the soils and reliability of rainfall in those states, conditions needed for the type of agriculture that has been one of the continuous economic bases of the region for over a century. These three eastern states sustain populations at the hamlet level which are more than a third larger than populations at the hamlet level in the drier western states—the Dakotas, Montana, and Nebraska. Average hamlet size in Iowa, Minnesota, and Wisconsin is 715 while it is 534 in the western states (Table 3.6). This difference in size, again, directly reflects the different historical settlement patterns in rural areas.

Table 3.5 Total Population by State and Trade Center Class, 1989

	0 Metro Areas	1 Primary Regional	2 Secondary Regional	3 Complete Shopping	4 Partial Shopping	5 Full Convenience	6 Minimum Convenience	7 Hamlet	*Total*
Wisconsin	905,479	670,527	847,651	791,840	454,467	365,142	538,356	201,527	*4,774,989*
Minnesota	2,153,781	126,676	315,645	397,034	304,453	216,940	357,710	329,344	*4,201,583*
Iowa	370,864	286,059	541,271	443,154	325,802	250,700	375,949	212,723	*2,806,522*
North Dakota	•	114,732	202,403	66,597	35,114	38,383	96,155	136,961	*690,345*
South Dakota	•	107,973	125,613	124,642	71,940	32,065	106,710	132,615	*701,558*
Nebraska	505,350	197,146	188,605	155,545	147,947	114,412	161,110	129,840	*1,599,955*
Montana	•	93,867	269,552	109,020	71,601	45,999	80,322	132,730	*803,091*
	3,935,474	*1,596,980*	*2,490,740*	*2,087,832*	*1,411,324*	*1,063,641*	*1,716,312*	*1,275,740*	*15,578,043*

Table 3.6 Average Population by State and Trade Center Class, 1989

	0 Metro Areas	1 Primary Regional	2 Secondary Regional	3 Complete Shopping	4 Partial Shopping	5 Full Convenience	6 Minimum Convenience	7 Hamlet
Wisconsin	905,479	134,105	44,613	13,892	6,586	3,580	2,153	829
Minnesota	2,153,781	126,676	39,456	14,705	5,536	3,499	2,080	779
Iowa	370,864	95,353	41,636	11,079	4,463	2,143	1,257	569
North Dakota	•	114,732	50,601	13,319	3,192	2,399	1,502	486
South Dakota	•	107,973	41,871	11,331	4,232	2,004	1,368	557
Nebraska	505,350	197,146	26,944	11,110	4,351	2,007	1,119	486
Montana	•	93,867	44,925	8,386	4,475	2,706	1,912	635

Changes in Regional Economic Patterns, 1960-1989

The number of business establishments in the Upper Midwest between 1960 and 1989 changed in five broad zones across the region (Figure 3.10). A northwest-southeast line through the Twin Cities marked the western limit of a region of stability or economic advance. Except for notable patches of significant decline in some of the iron mining areas of Minnesota and the northern cutover along Lake Superior in Wisconsin, the impression is one of economic health.

An "hourglass" region of what superficially seems to be relative weakness extends from the spring wheat regions of central North Dakota, south through eastern South Dakota and then spreads out to Iowa and Nebraska. Farm consolidations, drought, and locational disadvantages for recent growth industries have hurt this area, although the larger trade centers and their nearby districts appear to have thrived. Both Des Moines and Omaha-Council Bluffs are exceptions within this subregion.

Next, moving westward, are the fossil fuel boom areas of the western Dakotas and eastern Montana. The spillover effects of this high growth in the 1970s have not yet died. Central Montana experienced decline while western Montana appears to have added significant numbers of establishments during the last three decades. Much of this growth can be attributed to the proliferation of recreation spots in this area.

The Dakotas, Iowa, and Nebraska lost business establishments in lower-order trade centers after 1960 (Table 3.7). Iowa lost almost 2,000 establishments from smaller places while adding others at higher levels. Nebraska's pattern was similar, though the losses in the lower-order trade centers were less, about 1,200. Meanwhile, Minnesota, Montana, and Wisconsin added businesses vigorously at all levels of their urban hierarchies. Three out of four gains, of a net regional gain of 118,000 business establishments in the Upper Midwest, were in these three states, with about two-thirds in Minnesota and Wisconsin alone. Aggregate growth in the eastern portion of the region appears to be continuing. The figures showing percentage change in number of establishments are much the same (Table 3.8). Although the correlation is far from perfect, the losses are confined to the three lowest ranks in the hierarchy, that is, the convenience centers and the hamlets. Meanwhile, the places where the number of establishments more than doubled are all in complete shopping centers or above.

The growth of population and economic activity across the Upper Midwest since 1960, the consolidation of some industries and the expansion of others, and the changes in consumption and investment patterns have modestly reordered the central place hierarchy in the region. The system of central places in 1989 is remarkably similar to that of 1960 both in its broad contours and in its details (Table 3.9). Some centers moved up in size and others lost but stability was the norm.

Table 3.7 Change in Number of Business Establishments by State and Trade Center Class, 1960-1989

	0	1	2	3	4	5	6	7	
	Metro Areas	**Primary Regional**	**Secondary Regional**	**Complete Shopping**	**Partial Shopping**	**Full Convenience**	**Minimum Convenience**	**Hamlet**	***Total***
Wisconsin	2,739	7,577	4,586	7,085	4,080	3,038	3,180	2,030	*34,315*
Minnesota	29,650	484	2,342	4,793	1,830	1,405	1,384	1,738	*43,626*
Iowa	3,565	2,867	1,403	3,328	453	**-477**	**-925**	**-532**	*9,682*
North Dakota	•	1,743	2,414	1,188	265	82	21	**-402**	*5,311*
South Dakota	•	1,285	1,445	1,305	467	28	**-159**	**-44**	*4,327*
Nebraska	5,250	2,043	1,570	1,858	208	**-152**	**-691**	**-343**	*9,743*
Montana	•	2,896	1,285	3,295	1,369	435	646	1,326	*11,252*
	41,204	*18,895*	*15,045*	*22,852*	*8,672*	*4,359*	*3,456*	*3,773*	*118,256*

Figure 3.10 Change in Number of Business Establishments, 1960-1989 (in percents)

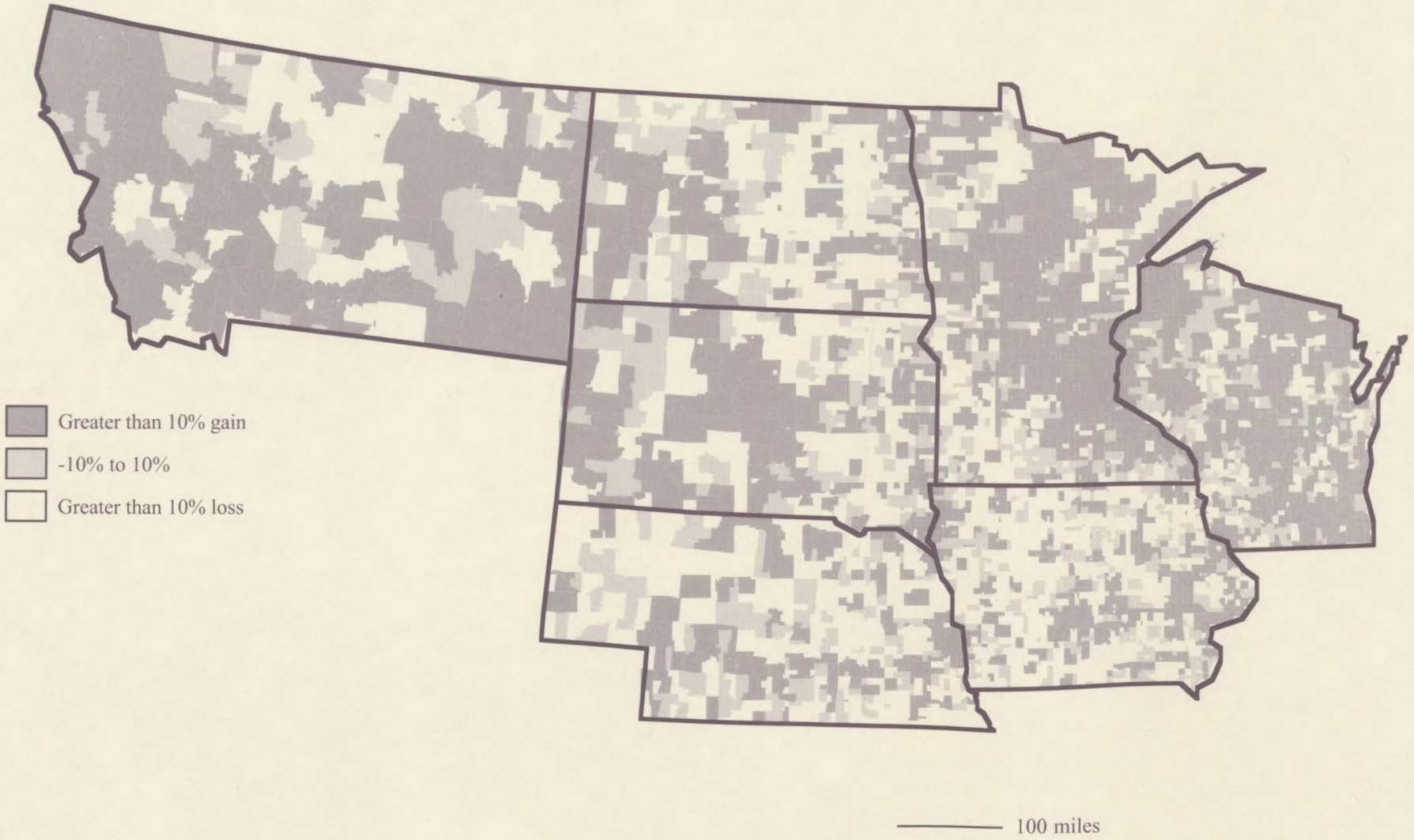


Table 3.8 Change in Number of Business Establishments by State and Trade Center Class, 1960-1989 (in percents)

	0 Metro Areas	1 Primary Regional	2 Secondary Regional	3 Complete Shopping	4 Partial Shopping	5 Full Convenience	6 Minimum Convenience	7 Hamlet	*Total*
Wisconsin	15	70	66	52	53	50	42	69	*46*
Minnesota	128	18	108	57	29	41	22	32	*75*
Iowa	61	38	23	28	7	**-7**	**-11**	**-14**	*17*
North Dakota	•	134	122	86	28	8	1	**-13**	*45*
South Dakota	•	78	101	46	27	3	**-6**	**-2**	*32*
Nebraska	76	93	56	34	6	**-5**	**-15**	**-13**	*32*
Montana	•	112	77	107	73	41	56	63	*83*

The limited amount of instability, especially among the higher-order centers, was due to the widening economic impact of the four metro centers. Most places that moved up the hierarchy between 1960 and 1989 lie within 100 miles of a metro area (Figure 3.11). These places form part of the integrated extended metro economy, although they retain their distinctive identities. These places, like Buffalo, Minnesota, and Waukesha, Wisconsin, have added businesses and made a relatively successful transition to a new economic era. Upgraded trade centers are uncommon outside the metro orbits except in the recreational areas of north-central Minnesota, western Montana, and central Wisconsin.

Table 3.9 Number and Percent of Trade Centers by Trade Center Class, 1960 and 1989

		Number 1960	Number 1989	Percent 1960	Percent 1989
0	**Metro areas**	4	4	0.1	0.1
1	**Primary regional**	18	13	0.5	0.3
2	**Secondary regional**	34	60	1	2
3	**Complete shopping**	189	167	5	4
4	**Partial shopping**	265	275	7	7
5	**Full convenience**	364	387	9	10
6	**Minimum convenience**	995	1,049	25	26
7	**Hamlet**	2122	2,036	53	51
		3,991	*3,991*	*100%*	*100%*

Prominent among places that moved down in the trade center hierarchy between 1960 and 1989 is the cluster in western Iowa, southwestern Minnesota, and eastern Nebraska (Figure 3.12). These areas suffered severe drought and agricultural reorganization that decimated their economic bases. Disposable farm-based income is down in several areas and population has sometimes dropped as well. On the other hand, in a wide area of the western Dakotas and eastern Montana no places moved down the hierarchy. The fossil fuel boom of the 1970s ended long ago and the map of loss may be partially camouflaging economic weakness just as the map of gain may be exaggerating economic health. New businesses may proliferate in times of economic advance, but they may also hang on after they cease producing a satisfactory return.

Figure 3.11 Places That Moved Up in the Trade Center Hierarchy, 1960-1989

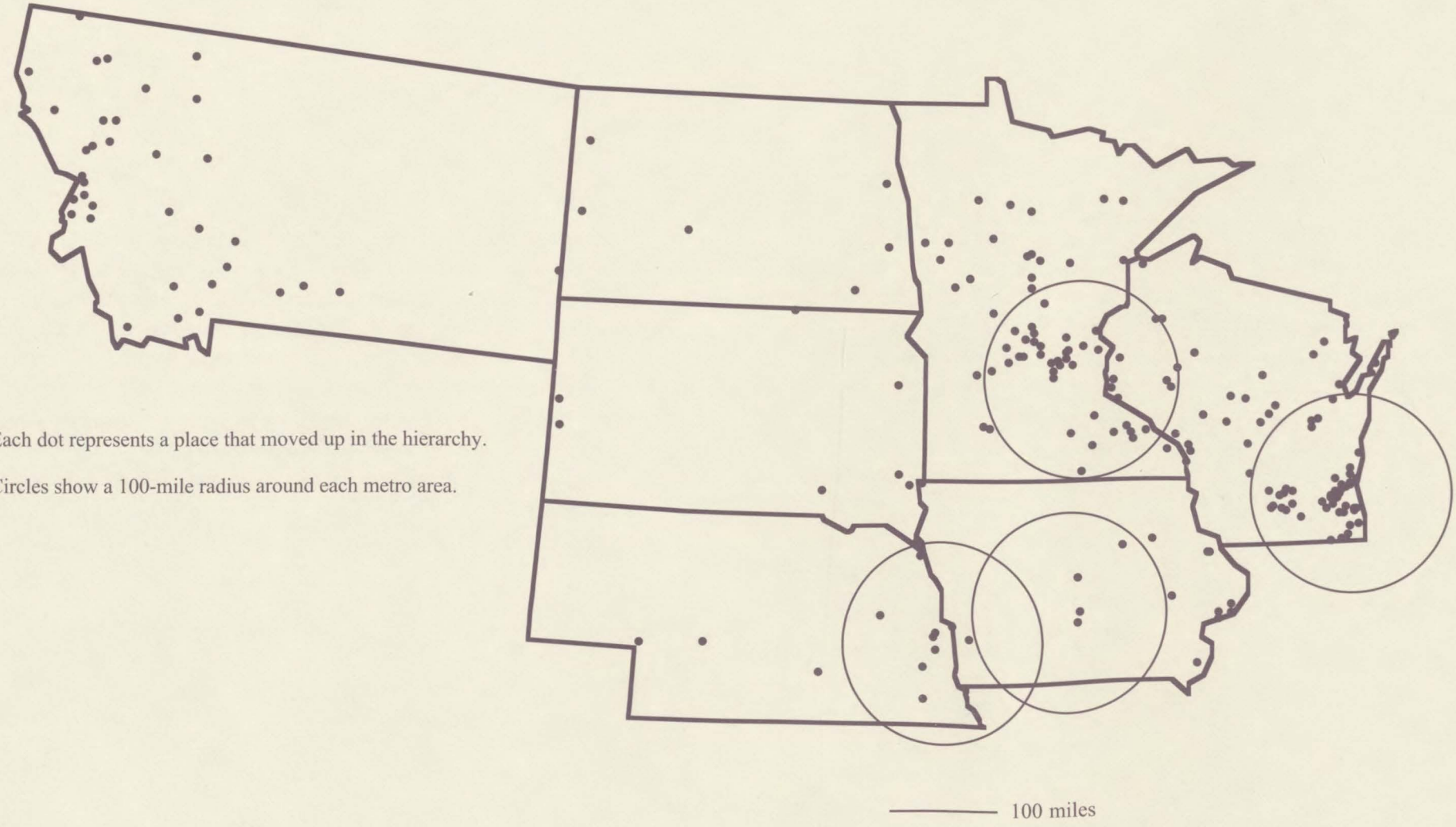
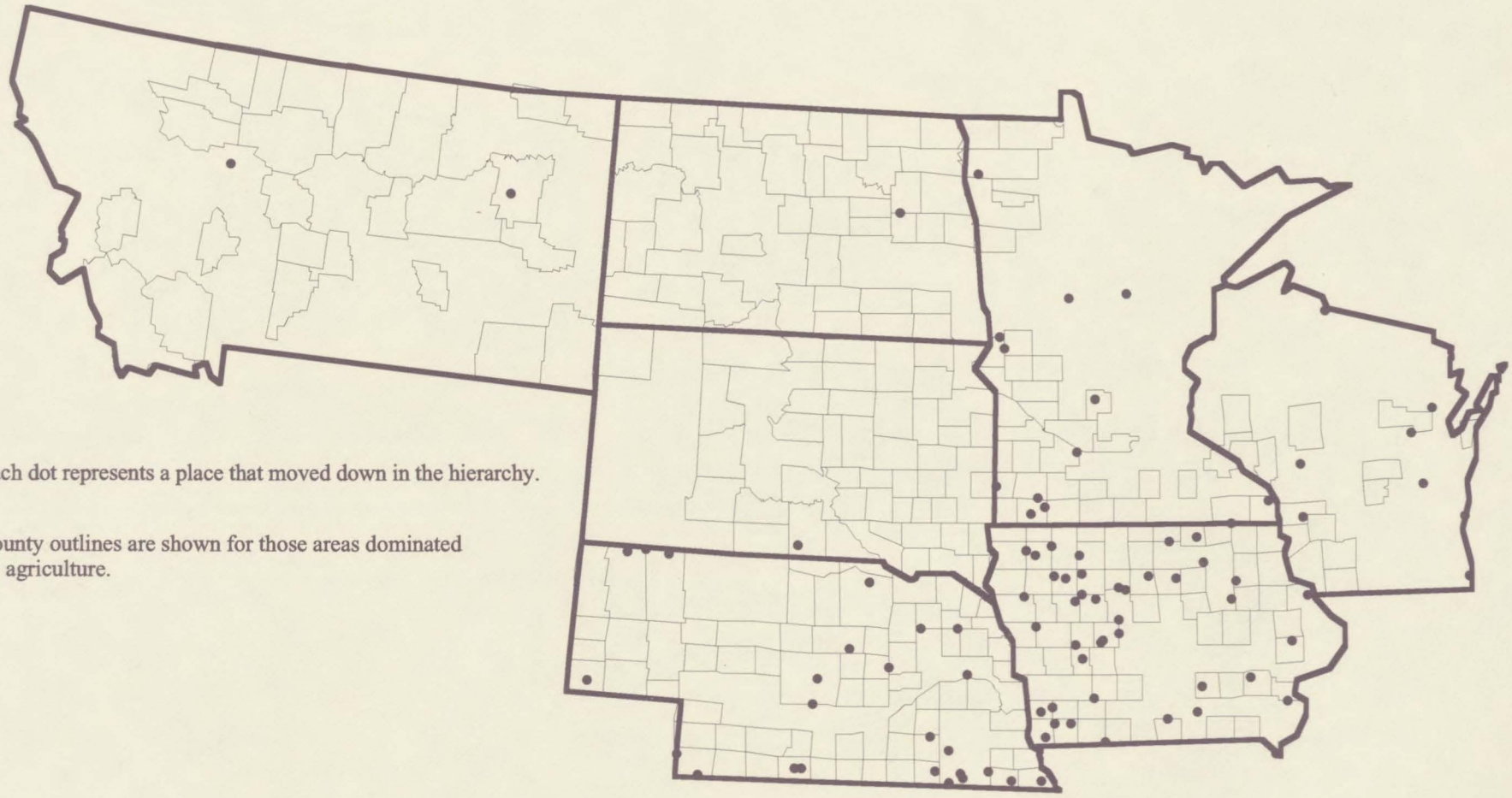


Figure 3.12 Places That Moved Down in the Trade Center Hierarchy, 1960-1989



Each dot represents a place that moved down in the hierarchy.

County outlines are shown for those areas dominated by agriculture.

100 miles

CHAPTER 4. THE MIX OF BUSINESS ACTIVITIES

While the overall spatial pattern of the trade center hierarchy in the Upper Midwest has remained relatively stable during the study period, telling changes are evident when one examines the change in the types of business establishments within the hierarchy of trade center classes. Two interdependent factors account for this change. First, industries have experienced absolute increases or declines as measured by the number of establishments. Second, some industries have grown faster than others due to structural changes. In centers of every size in the Upper Midwest, all industry categories have increased in the number of their establishments with the exception of retailing. The number of retail trade establishments has grown marginally in high level centers but has decreased in lower levels. In contrast to this decline, service establishments have experienced high growth and construction and wholesaling establishments have also grown.

The proportion of businesses in each industry at each level of the hierarchy has changed considerably (Figure 4.1). Compared with 1960, smaller places in 1989 exhibit economic profiles that are more congruent with larger places. The exception to this pattern is in the service industry. The service sector is greatly influenced by forces of agglomeration, that is, services tend to locate where other services and businesses are found. Looking at 1960, one finds that in the metro areas services accounted for 14 percent of total business activity whereas in hamlets services made up 11 percent. By 1989, this range had widened from 29 percent in metro areas to 14 percent in hamlets.

The diminished but still significant role of retailing is strikingly apparent in the 1989 profiles. In the higher level centers retail growth has not kept pace with the other industries analyzed in the number of establishments. At lower levels there has been an actual decrease in the number of retail establishments. In metro areas, for example, retailing accounted for 44 percent of the establishments in 1960 but only 26 percent by 1989. On the other end of the hierarchy, retail establishments dropped from 61 percent to 34 percent in hamlets. Although retailing is still a major economic force in the economy, the number of stores at lower levels of the hierarchy has declined as the retail industry has undergone a major restructuring. The development of marketing and advertising, advances in communications, and an increase in general consumer mobility have allowed retail businesses to become much larger operations and to serve larger populations with fewer establishments.

In essence, the way business is done today differs substantially from the way it was done in 1960. Some industries have centralized and consolidated; others have expanded in their numbers as people have opted for self-employment and entrepreneurial activities. Retailing is an example of consolidation. In 1989, the same income and turnover of merchandise that were generated by numerous small stores in 1960 were achieved by fewer, larger stores. Retail outlet centers and discount stores typify this development. The absolute decrease in number of retail establishments at the lower levels of the hierarchy has been taken up by other industry categories, particularly by construction and wholesale trade (Table 4.1). Internal changes in the types of retailing found at all levels are significant. Declines in the number of food stores, hardware stores, and other traditional main street anchors have been offset by a large growth in businesses categorized as miscellaneous retail establishments. These include boutiques, antique stores, craft and hobby stores, and other similar operations.

The service sector is an example of expansion. The emergence of this sector as a major part of the economy, especially in the four largest classes of trade centers, represents a fundamental change in the economy over the past three decades. Service establishments provide diverse services to both individuals and other business firms. Many specific and inter-related services are necessary to satisfy the needs of any given community and their economic base. These

Figure 4.1 Mix of Industries Within Each Trade Center Class, 1960 and 1989 (in percents)

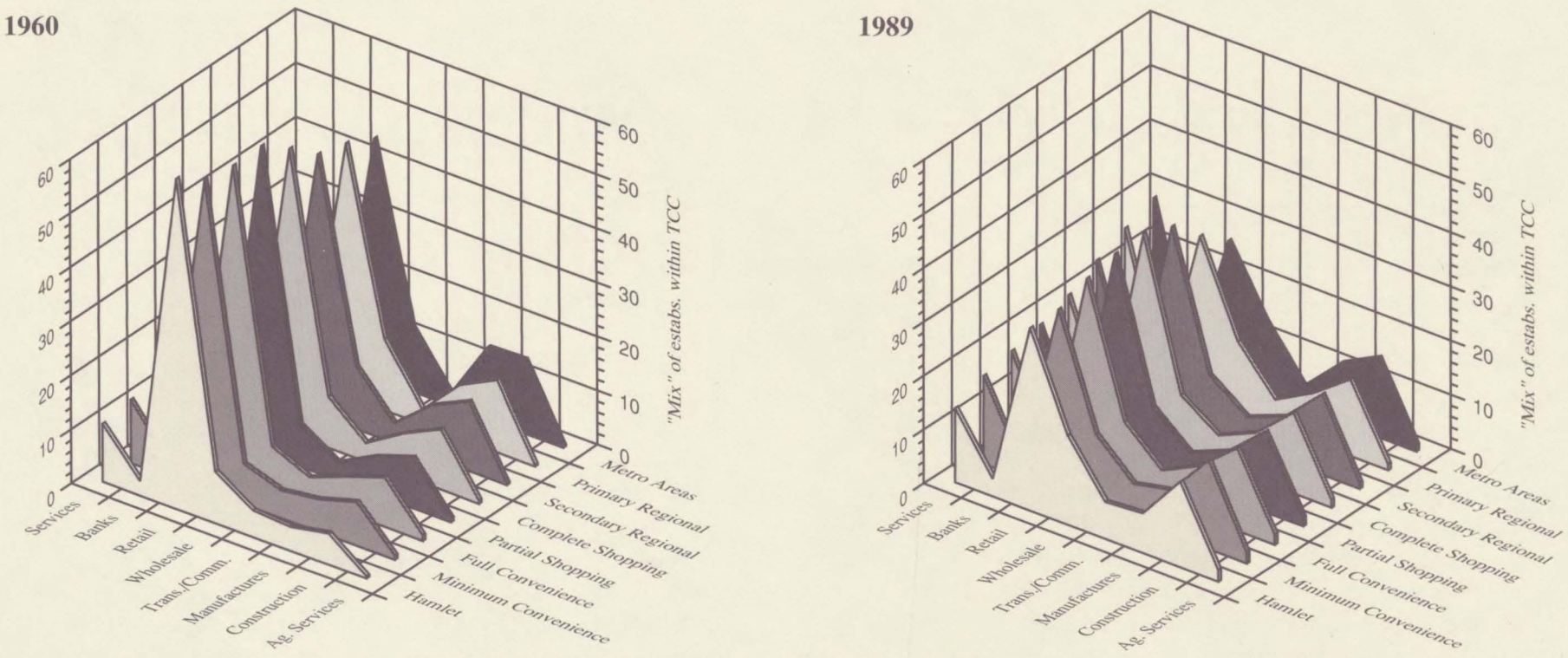


Table 4.1 Mix of Industry Categories Within Each Trade Center Class, 1960 and 1989 (in percents)

		Count*	Agr. Services		Construction		Manufactures		Trans./Comm.		Wholesale		Retail		Banks		Services		*Total Estabs.*	
			1960	1989	1960	1989	1960	1989	1960	1989	1960	1989	1960	1989	1960	1989	1960	1989	1960	1989
0	Metro Areas	0.1	0	1	14	15	13	11	2	4	12	14	44	26	0	1	14	29	*100*	*100*
1	Primary Regional	0.3	0	1	13	14	10	9	3	5	13	13	47	30	0	1	13	26	*100*	*100*
2	Secondary Regional	2	0	1	13	15	10	8	4	5	12	11	48	35	0	1	13	24	*100*	*100*
3	Complete Shopping	4	1	1	11	15	8	9	3	6	10	10	53	37	1	1	14	21	*100*	*100*
4	Partial Shopping	7	1	2	9	15	7	9	3	6	8	12	57	37	1	1	14	19	*100*	*100*
5	Full Convenience	10	1	2	9	15	7	9	4	6	7	12	57	36	2	2	13	17	*100*	*100*
6	Minimum Convenience	26	1	2	8	16	6	8	5	7	8	13	58	34	3	3	12	16	*100*	*100*
7	Hamlet	51	0	2	6	16	4	7	5	7	10	17	61	34	3	3	11	14	*100*	*100*
	7-State Region	*100*	1	2	7	16	5	8	5	7	9	15	59	34	2	3	12	16	*100*	*100*

*Percent of total number of central places in 1989

figures, however, mask both the size of service firms and their capacity to generate employment. Large numbers of service establishments tend to be small operations that are highly specialized and employ small numbers of people at relatively low wages.

The development of the construction industry is pronounced in smaller places. Construction now accounts for an almost uniform 15 percent of the establishments at all levels of the hierarchy. The growth of this industry at lower level centers is mainly a product of a high degree of specialization; construction establishments are small in nature and narrow in function, a situation comparable to service establishments. Furthermore, contractors now tend to locate in smaller centers while still serving a wide area.

Taking another look at the data by comparing the average number of establishments in each industry category in 1960 and 1989, one notices again the high growth in services (Table 4.2). The increase is especially marked at the higher levels of the hierarchy. On average, services more than tripled in metro areas between 1960 and 1989 and nearly quadrupled in primary regional centers. This has created a concentration of service establishments at the top end of the hierarchy (Figure 4.2). Overall, services showed a gross increase of approximately 51,000 establishments, almost double that of the next fastest growing industry (Table 4.3).

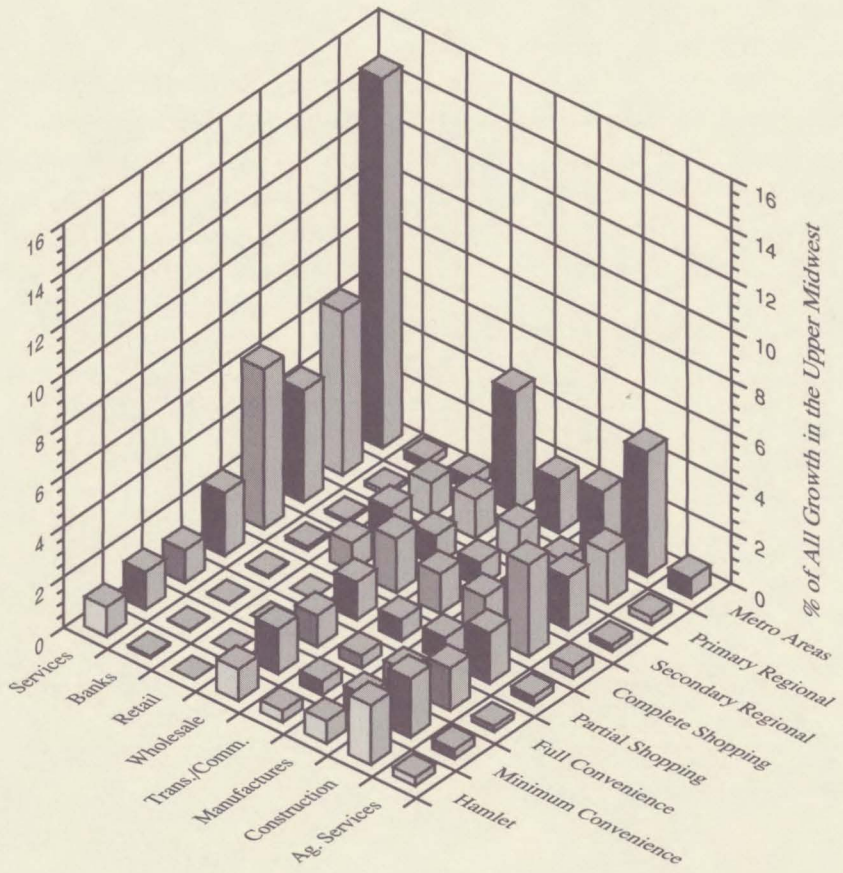
Table 4.2 Average Number of Business Establishments by Trade Center Class and Industry Category, 1960 and 1989

		Agr. Services		Construction		Manufactures		Trans./Comm.		Wholesale		Retail		Banks		Services		*Total Estabs.*	
		1960	1989	1960	1989	1960	1989	1960	1989	1960	1989	1960	1989	1960	1989	1960	1989	*1960*	*1989*
0	Metro areas	50	307	1,856	3,518	1,819	2,656	302	1,014	1,620	3,220	6,001	6,170	33	145	1,855	6,807	*13,535*	*23,836*
1	Primary regional	5	36	214	439	158	278	44	160	212	414	751	937	5	21	212	820	*1,600*	*3,104*
2	Secondary regional	3	12	87	153	65	84	25	56	79	109	327	366	3	8	89	247	*676*	*1,034*
3	Complete shopping	2	5	27	50	19	29	9	18	23	35	130	126	2	3	33	70	*245*	*335*
4	Partial shopping	1	2	10	21	8	12	4	8	8	16	61	52	1	2	15	26	*108*	*140*
5	Full convenience	1	1	6	11	4	7	3	4	5	9	35	26	1	1	8	13	*62*	*72*
6	Minimum convenience	0	1	3	6	2	3	2	2	2	5	19	12	1	1	4	6	*33*	*35*
7	Hamlet	0	0	1	2	0	1	1	1	1	2	6	3	0	0	1	1	*10*	*10*

Table 4.3 Change in Number of Business Establishments by Trade Center Class and Industry Category, 1960-1989

		Agr. Services	Con-struction	Manu-factures	Trans./ Comm.	Whole-sale	Retail	Banks	Services	*Total Estabs.*
0	Metro areas	1,029	6,648	3,348	2,845	6,402	674	450	19,808	*41,204*
1	Primary regional	411	2,729	1,123	1,709	2,114	1,833	230	8,713	*18,895*
2	Secondary regional	348	2,787	995	1,279	1,588	1,901	161	5,968	*15,045*
3	Complete shopping	631	4,905	2,038	2,124	2,889	1,514	214	8,538	*22,852*
4	Partial shopping	426	2,694	1,287	1,119	2,013	**-2,336**	112	3,359	*8,672*
5	Full convenience	299	2,246	992	671	1,672	**-3,302**	43	1,739	*4,359*
6	Minimum convenience	491	3,139	1,100	739	2,378	**-6,444**	52	2,003	*3,456*
7	Hamlet	445	3,166	1,193	611	1,685	**-5,015**	120	1,568	*3,773*
		4,080	*28,314*	*12,076*	*11,097*	*20,741*	***-11,175***	*1,382*	*51,696*	*118,256*

Figure 4.2 Growth in Number of Business Establishments by Industry and Trade Center Class, 1960-1989 (in percents)



The wholesale and construction sectors showed similar large increases in their average numbers, almost doubling in size at all levels of the hierarchy (see Table 4.2). In absolute numbers these two industries expanded the most after the service industry. Construction gained approximately 28,000 establishments and wholesaling 20,000. The disproportionate change in the number of construction industries in hamlets and minimum convenience centers may reflect the large numbers of people in these small places who have entered self-employment in the last thirty years.

The slow but steady growth of manufacturing businesses at all levels of the hierarchy has resulted in a total gain of over 12,000 establishments between 1960 and 1989. Manufacturing industries continue to be important generators of income and employment both within manufacturing itself and through secondary establishments that serve them. As such, the strength of the manufacturing industry continues to be a keystone in the economy.

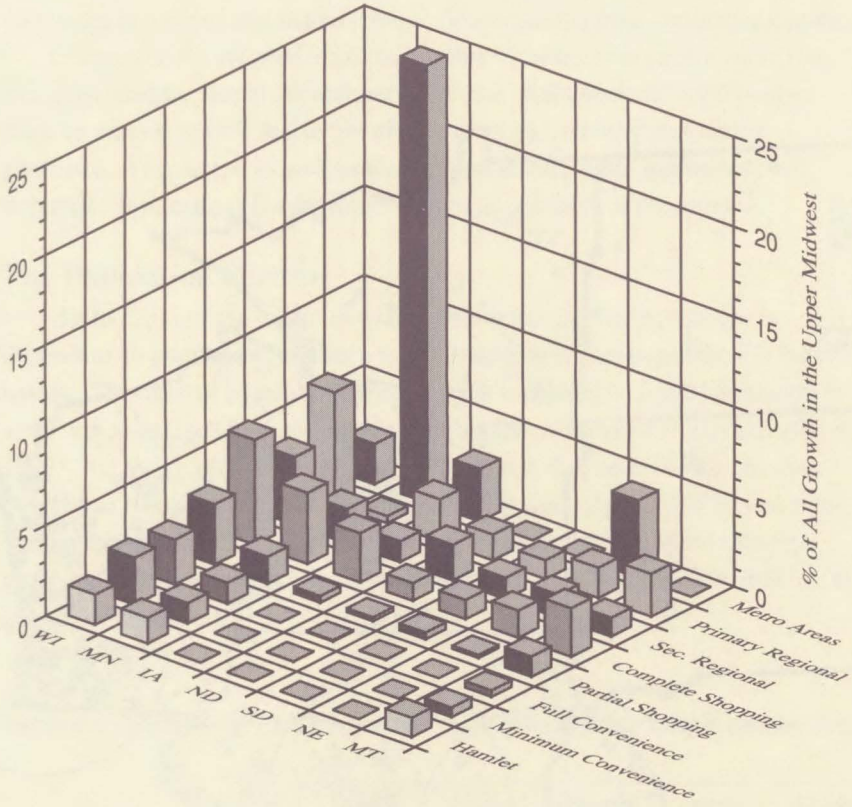
The transportation and communications sector, as expected by its major distributive role in today's economy, expanded appreciably at the higher levels of the hierarchy. By 1989, over 11,000 establishments had been added. Distributive industries in the present economy are increasingly concentrated at centers of new capital investment, i.e., in the high-order trade centers. They are drawn there by a number of factors. In these larger centers inventory can be controlled more easily, more specialties can be handled, and "hub and spoke" delivery is more efficient. These operations are able to meet consumers' needs with the minimum amount of goods in hand.

Although increases in the number of agricultural service establishments have been minimal compared to other industries, there has been considerable growth in the higher order central places. Metro areas experienced a sixfold increase and primary regional centers a sevenfold increase. Agricultural services quadrupled in secondary regional centers and doubled in complete and minimum convenience centers. Similarly, growth in the banking sector was small, but in the largest urban places there was more than a fourfold increase. This suggests that consolidation and concentration of financial power and control in the biggest places has diluted the share held in small places.

The only economic sector to lose establishments in the region was the retail sector. A net loss of over 11,000 establishments came from a dramatic decline at the four lowest levels of the hierarchy rather than a decrease across all levels. This reflects the nationwide structural changes toward consolidation of retail stores. In 1960 there was an average of six retail establishments in every hamlet, but by 1989 this number had dropped to three.

Looking at the region state by state, one finds that growth in the number of business establishments in the Upper Midwest has been dominated by the Twin Cities metropolitan area (Figure 4.3). The Twin Cities has historically been the focus of financial, social, cultural, and economic activities in the region. In stark contrast to this growth is a dramatic lack of growth in lower-order centers which still depend on agriculture for their economic vitality. More specifically,

Figure 4.3 Growth in Number of Business Establishments by State and Trade Center Class, 1960-1989 (in percents)



these are the hamlets and full and minimum convenience centers in Iowa, Nebraska, North Dakota, and South Dakota where the number of business establishments has stagnated or even declined. In these four states, dominated by agriculture, growth in the number of businesses has occurred almost exclusively in the higher-order centers. In the more urbanized states of Minnesota, Montana, and Wisconsin, where agricultural is less dominant, growth has occurred across the full range of the trade center hierarchy, though that growth has not been evenly distributed.

The Employment Factor

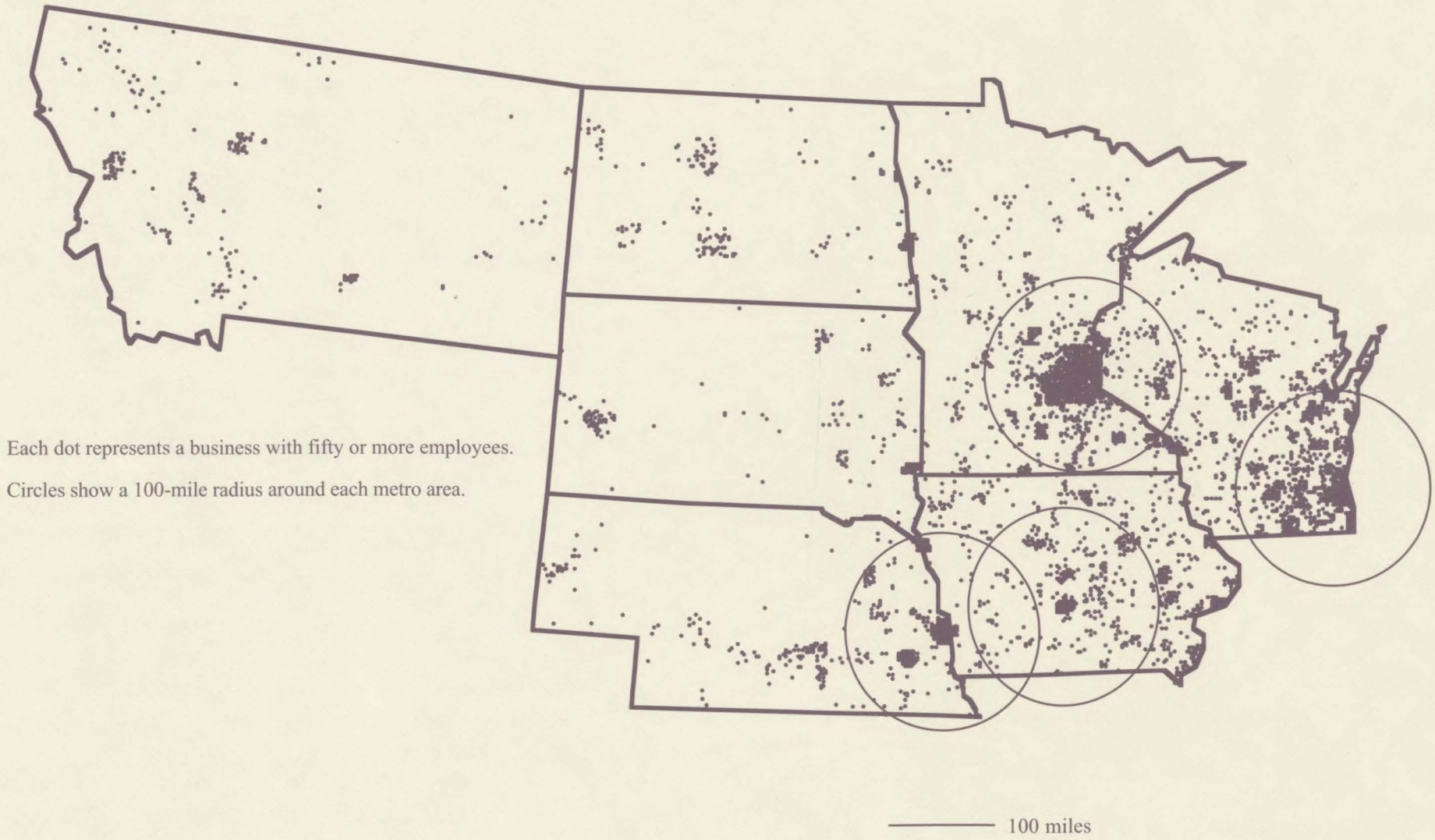
While the number of manufacturing establishments showed a moderate increase (12,076) compared with that of services (51,696), the role of manufacturing in creating employment is far greater. In 1989 manufacturing had the largest number of establishments (3,403) employing more than fifty people (Table 4.4). The retail industry was the next largest employer with 2,415 firms. In contrast, the service establishments analyzed had only 921 businesses employing more than fifty people. Among the largest establishments (500 or more employees), manufacturing accounted for 71 percent.

Since major employers act as foci in attracting other enterprises and economic growth to an area, examining where major business establishments are located is useful in planning future economic development efforts at both the local and state levels. The more urbanized, eastern third of the Upper Midwest region, with Minnesota and Wisconsin in particular, accounts for a large portion of businesses employing fifty or more people (Figure 4.4). The strong position of the metropolitan centers and primary and secondary regional centers throughout the region also stands out clearly.

Table 4.4 Number of Business Establishments Employing Fifty or More People by Industry Category, 1989

	Number of Employees				
	50-99	**100-249**	**250-499**	**500&up**	***Total***
Agricultural services	7	9	3	0	*19*
Construction	161	73	10	8	*252*
Manufactures	1,173	1,244	558	428	*3,403*
Trans./Comm.	381	249	75	47	*752*
Wholesale	472	246	49	17	*784*
Retail	1,458	798	133	26	*2,415*
Banks	170	63	14	17	*264*
Services	446	315	99	61	*921*
	4,268	*2,997*	*941*	*604*	*8,810*

Figure 4.4 Business Establishments With Fifty or More Employees



Each dot represents a business with fifty or more employees.

Circles show a 100-mile radius around each metro area.

100 miles

Forty percent of large employers (250 or more employees) are found in the four metropolitan areas and 87 percent in the four largest trade center classes (Table 4.5). The relative strength of manufacturing in the lowest four trade center classes is obvious and manufacturing dominates the other industry categories.

Changes in the proportions of businesses by industry at each level of the hierarchy, and the rise in the number of service establishments in particular, must be viewed against this larger picture of employment opportunities generated. This factor, as well as the location of such large businesses, has important implications for the future economic potential of the region.

The Population Factor

In order to examine the extent to which growth in a particular industry is dependent on population, an index was created that relates population to businesses. The number of establishments in each industry per 1,000 population in 1960 was subtracted from the number of establishments per 1,000 population in 1989. The results were rank ordered for the seven-state area in order to show the change that had occurred (Table 4.5). Industries are classified by two-digit Standard Industrial Classification codes. The index can be divided into four groups to highlight fast (1.13 to .20), moderate (.15 to .10), and slow (.09 to .00) growth as well as decline (-.16 to -.93).

Group 1: Fast Growth Industries, With Indices of .20 or More

The ten highest growth industries, with respect to population, have grown as a result of increased specialization. This structural change has come about in two ways. First, the development of new services and activities within certain industries has created growth and, second, changes in the law have fragmented some industries that have then responded with spurts of high growth. An example of the first pattern is the business services category (SIC 73). Since 1960, several new three- and four-digit classifications have been added, such as computer and data processing services (SIC 737) and services to buildings (SIC 734). Similarly, in wholesale trade (SIC 50) the domination of large establishments offering a diverse range of products in 1960 had, by 1989, devolved into a larger number of establishments focused on specific product lines. This process is further reflected in the many changes that have occurred in the SIC system itself between 1960 and 1989, changes that are an attempt to incorporate the changing economy and its respective establishments.

An example of the second pattern is found in the trucking and warehousing category (SIC 42), where increases, in large part, came about because of the deregulation in the trucking industry. This has allowed more businesses to be established and more trucking companies to serve different locations.

Table 4.5 Number of Establishments with 250 or More Employees by Trade Center Class and Industry Category, 1989

		Agr. Services	Con-struction	Manu-factures	Trans./ Comm.	Whole-sale	Retail	Banks	Services	*Total Estabs.*
0	**Metro areas**	0	11	287	55	39	97	21	113	*623*
1	**Primary regional**	0	4	141	34	8	26	10	16	*239*
2	**Secondary regional**	2	3	196	14	7	23	0	11	*256*
3	**Complete shopping**	0	0	192	5	8	7	0	7	*219*
4	**Partial shopping**	1	0	90	5	2	2	0	2	*102*
5	**Full convenience**	0	0	39	0	1	1	0	2	*43*
6	**Minimum convenience**	0	0	31	2	1	2	0	4	*40*
7	**Hamlet**	0	0	10	7	0	1	0	5	*23*
		3	*18*	*986*	*122*	*66*	*159*	*31*	*160*	*1,545*

Within each state, the rankings of the fast growth industries show little variation from that of the region as a whole (see Table 4.6). In both Minnesota and Montana these industries showed more rapid expansion than in other states. The growth in Minnesota is the result of its continuing and increasing dominance as the business center of the Upper Midwest, mainly due to the Twin Cities metropolitan area. The growth in Montana stems from the rise and development of fossil fuels in Montana in the mid-1970s in response to the oil embargo of 1973 and a lag in response to the "bust" of the 1980s. Development of tourist trade has also created many new businesses in Montana, particularly in the service and construction industries.

Group 2: Moderate Growth Industries, With Indices From .10 to .15

These industries are transitional between the fast growth industries of Group 1 and the slow growth industries of Group 3 (see Table 4.6). On the whole, these industries are moving toward specialization. Industrial machinery and equipment (SIC 35) and printing and publishing (SIC 27) show considerable variation by state, yet they have high indices when compared to other manufacturing activities which generally fall into Group 3. Specialization within the manufacturing process of these industries is causing their numbers to rise as more establishments are created to perform complementary functions within manufacturing as well as in other industries. This results in a more flexible form of production where each firm deals with one step of an interrelated production process that involves many different firms.

Rankings within each state for this group of industries are fairly consistent with the rankings for the region as a whole. All of Iowa's indices, however, fall below the lower range (.10). This may simply reflect the large number of establishments present in Iowa in 1960 and the small relative increase since. Because the index shows growth in relation to population and because Iowa has had a high population throughout the period of the study, the change in the number of establishments may be masked in relation to other states. Minnesota and Montana are, again, above average for nearly all of these industries.

Table 4.6 Growth in Number of Business Establishments in Each Industry Category per Thousand Population, 1960-1989

	SIC*	WI	MN	IA	ND	SD	NE	MT	*Average*
Business services	**73**	1.07	1.54	.81	.81	.73	1.14	1.14	*1.13*
Real estate	**65**	.98	1.35	.80	1.13	.88	1.04	1.51	*1.08*
Wholesale trade - all goods	**50**	.87	1.32	.96	1.55	1.22	1.05	1.24	*1.07*
Special trade contractors	**17**	.52	1.14	.55	1.07	.83	.92	1.23	*.81*
General building contractors	**15**	.54	.85	.66	.64	.69	.71	.78	*.69*
Miscellaneous retail	**59**	.31	.46	.05	.62	.43	**-.07**	1.04	*.31*
Trucking and warehousing	**42**	.27	.35	.20	.55	.40	.26	.59	*.30*
Agricultural services	**07**	.19	.22	.17	.42	.39	.42	.39	*.25*
Auto repair services	**75**	.32	.21	.10	.16	.18	.16	.46	*.22*
Amusement & recreation services	**79**	.20	.22	.19	.09	.22	.16	.38	*.20*
Hotels, other lodging places	**70**	.18	.21	.03	.13	.35	.00	.22	*.15*
Industrial machinery, equipment	**35**	.14	.21	.05	.14	.15	.06	.11	*.14*
Furniture, homefurnishings stores	**57**	.03	.21	.09	.28	.16	.15	.30	*.13*
Printing and publishing	**27**	.11	.14	.07	.04	.04	.04	.17	*.10*
Transportation services	**47**	.10	.13	.07	.09	.05	.08	.13	*.10*

continued...

**Two-digit Standard Industrial Classification*

Table 4.6 (continued)

	SIC*	WI	MN	IA	ND	SD	NE	MT	*Average*
Personal services	72	.09	.14	.04	.11	.00	.06	.22	*.09*
Apparel and accessory stores	56	.00	.09	.17	.19	.15	.11	.20	*.09*
Electric, gas, and sanitary services	49	.08	.08	.06	.12	.10	.09	.13	*.08*
Lumber and wood products	24	.07	.09	.02	.06	.03	.03	.37	*.08*
Fabricated metal products	34	.08	.09	.04	.05	.08	.04	.06	*.07*
Motion pictures	78	.05	.09	.04	.08	.06	.05	.12	*.06*
Depository institutions	60	.06	.04	.07	.14	.09	.08	.07	*.06*
Electronic, other electrical equip	36	.05	.10	.03	.04	.04	.04	.03	*.06*
Rubber, misc. plastics products	30	.07	.08	.04	.01	.03	.04	.02	*.06*
Communications	48	.05	.05	.02	.13	.12	**-.01**	.17	*.05*
Heavy construction, except building	16	.00	.05	.09	.11	.02	**-.01**	.28	*.05*
Miscellaneous manufacturing	39	.03	.07	.01	.05	.09	.01	.10	*.05*
Instruments, related products	38	.04	.08	.02	.00	.02	.01	.03	*.04*
Local, interurban passenger transit	41	.04	.04	.02	.04	.05	.02	.04	*.04*
Clay, stone, and glass products	32	.02	.01	.04	.07	.10	.04	.11	*.03*
Miscellaneous repair services	76	.03	.07	**-.01**	.02	.07	**-.04**	.23	*.03*
Air transportation	45	.02	.03	.03	.04	.03	.03	.08	*.03*
Transportation equipment	37	.01	.02	.03	.03	.05	.02	.04	*.02*
Water transportation	44	.02	.02	.02	.00	.01	.01	.02	*.02*
Apparel, other textile products	23	.00	.03	.01	.02	.05	.01	.07	*.02*
Furniture and fixtures	25	.01	.02	.00	.03	.01	.02	.05	*.02*
Paper and allied products	26	.02	.02	.01	.00	.01	.01	.01	*.01*
Textile mill products	22	.01	.01	.01	.01	.01	.01	.02	*.01*
Eating and drinking places	58	**-.39**	.14	.22	.09	.60	**-.16**	.46	*.01*
Primary metal industries	33	.00	.01	.00	.00	.01	.02	.02	*.01*
Pipelines, except natural gas	46	.00	.00	.01	.01	.00	.00	.01	*.00*
Chemicals and allied products	28	.00	.01	**-.01**	.01	.01	.00	.04	*.00*
Leather, leather goods	31	**-.02**	.00	.01	.00	.01	.01	.05	*.00*
Petroleum and coal products	29	.00	.00	.00	.02	.00	.00	.00	*.00*
Food and kindred products	20	**-.21**	**-.16**	**-.17**	**-.09**	**-.10**	**-.15**	**-.06**	***-.16***
General mechandise stores	53	**-.33**	**-.35**	**-.25**	**-.42**	**-.45**	**-.28**	**-.33**	***-.33***
Building materials, garden supplies	52	**-.44**	**-.51**	**-.84**	**-.96**	**-.91**	**-.82**	**-.52**	***-.64***
Food stores	54	**-.79**	**-.82**	**-.74**	**-.54**	**-.55**	**-.63**	**-.34**	***-.73***
Automotive dealers, service stations	55	**-.74**	**-.87**	**-1.00**	**-.96**	**-1.27**	**-1.18**	**-.92**	***-.93***

**Two-digit Standard Industrial Classification*

Group 3: Slow Growth Industries, With Indices From .00 to .09

These are the industries where positive growth in relation to population was slowest. It is significant that sixteen of the manufacturing industries analyzed fall into this group. An inference is that manufacturing industries are not dependent upon population size. This is not surprising given that manufacturers do not directly serve consumers but rather produce goods which reach consumers through the distributive industries such as retailing, transportation, and wholesaling.

Looking at the non-manufacturing side, one finds that the regional average index for eating and drinking places (SIC 58) is comprised of a wide range of individual indices that vary greatly from the mean. For example, Iowa, Minnesota, Montana, and South Dakota have indices much higher than the average (.22, .14, .46, and .60, respectively) whereas Nebraska and Wisconsin have negative indices (-.16 and -.39, respectively). This divergent pattern makes it difficult to make generalizations about the industry as a whole.

Group 4: Industries With Negative Indices

Industries in this group reveal a different structural response from those in Group 1. Here, fewer, larger establishments develop to serve a population which formerly was served by many smaller outlets. In these industries, more people does not mean more establishments. Thus, a single large establishment is able to serve a large population, unlike the industries in Group 1 where establishments have multiplied and intra-industry specialization occurs in order to meet the needs of the population. For example, auto dealers and service stations (SIC 55), food stores (SIC 54), and building materials and garden supplies (SIC 52) are all industries which rely on high turnover of merchandise from a single large outlet rather than depending on many smaller stores to serve the same size population. Present day large stores have both lower prices and greater variety. These characteristics, combined with a real income that is, on average, higher than it was in 1960, stimulate high turnover and high volume.

The Overall Change

Though movement between trade centers has been minimal, the economic composition of trade centers themselves in the Upper Midwest has changed over the last three decades. Some industries have experienced specialization which, in turn, has led to a proliferation of establishments in particular industry categories. This growth has occurred primarily in larger trade centers. Alternatively, other industries—most notably retail—have consolidated, resulting in fewer, but larger, operations. Higher order centers have primarily been the beneficiaries of this change; lower level centers have been hurt due to the tendency for large-scale operations to locate in those places with good access to transportation and a wide variety of services. Overall, metropolitan centers increasingly dominate the region. Smaller centers have come to more closely resemble larger centers in terms of the cross-section of business establishment types that they now encompass.

CHAPTER 5. FINDINGS AND CONCLUSIONS

The study confirms the continuing existence of an eight level trade centers hierarchy that was first revealed by the Upper Midwest Economic Study in 1961. This hierarchy is based on the economic activities and spheres of economic influence of the almost 4,000 trade centers—towns and cities—of the region. The hierarchy consists of the following (from the highest to the lowest levels):

- Four metropolitan centers, with an average population of 983,869 and an average of 23,836 business establishments (Milwaukee, Des Moines, Omaha-Council Bluffs, and the Twin Cities of St. Paul and Minneapolis).
- Thirteen primary regional centers, with an average population of 122,845 and an average of 3,104 business establishments.
- Sixty secondary regional centers, with an average population of 41,512 and an average of 1,034 business establishments.
- One-hundred-sixty-seven complete shopping centers, with an average population of 12,502 and an average of 335 business establishments.
- Two-hundred-seventy-five partial shopping centers, with an average population of 5,132 and an average of 140 business establishments.
- Eighty-seven full convenience centers, with an average population of 2,748 and an average of 72 business establishments.
- One-thousand-forty-nine minimum convenience centers, with an average population of 1,636 and an average of 35 business establishments.
- Two-thousand-thirty-six hamlets, with an average population of 625 and an average of 10 business establishments.

Not only does the hierarchy continue to exist, but it remains surprisingly stable despite important internal changes:

- Fewer than 10 percent of the towns and cities moved either up or down within the hierarchy during the period 1960 to 1989.
- There were, however, significant changes in the mix of business activities handled by the trade centers. These changes include: phenomenal growth in the number of service establishments (up 51,696), a decrease in the number of retail establishments (down 11,175), and a moderate increase in the number of manufacturing establishments (up 12,076). Important changes within the retail category—decline of traditional retailing and increases in the miscellaneous category, particularly in small centers—have altered the character of the retail function. For example, there are many more boutique and antique stores and fewer hardware and grocery stores in 1989 than in 1960.
- The trade center hierarchy as a whole shifted, with the higher and lower order places moving away from each other over the study period. The lowest three classes of trade centers—hamlets and minimum and full convenience centers—occupy a less important position within the regional economic system than they did a generation ago. The highest three classes—metropolitan areas and primary and secondary regional centers—play a far more dominant role than they did a generation ago.
- The extent that individual places moved up or down the trade center hierarchy was as a function of both large-scale economic forces and small scale influences, such as individual business successes and local planning efforts.

For the most part, economic growth has been steady throughout the Upper Midwest, but this growth has been unevenly distributed, both geographically and within the hierarchy:

- The greatest concentration of growth occurred in the eastern third of the region. This is the area where most higher level trade centers are located, as well as the four metropolitan areas. Because trade centers in this portion of the region benefited from the major economic trends affecting the Upper Midwest, these places experienced robust growth.
- The four metropolitan areas and the seventy-three regional centers captured most of the increase in the number business establishments. In fact, most places that moved up the hierarchy lie within a hundred mile radius of one of the four metropolitan areas.
- The trade centers that moved down the hierarchy are, for the most part, in areas that suffered from drought and agricultural reorganization (western Iowa, southwestern Minnesota, and eastern Nebraska are examples).
- Agricultural services, transportation and communication businesses, retail establishments, banks, and service industries grew mainly in the higher level trade centers.
- Average numbers of establishments in manufacturing, construction, and wholesale business showed growth at all levels of the trade centers hierarchy.
- Some lower level trade centers, which might have had a difficult time surviving changes during the study period, continue to exist. Several reasons for their survival are apparent: agriculture remained important, new natural-resource-based economies developed, tourism and recreation replaced previous natural-resource-based economies, and local innovation and entrepreneurship offset the larger trends in some towns and cities.

The evolution of the trade centers hierarchy is largely explained by four major trends that affected the Upper Midwest during the past thirty years:

- **The population of the Upper Midwest continued to migrate from rural to urban areas**—from smaller cities and towns to larger ones, further up the trade centers hierarchy. This movement was essentially a redistribution of people since the overall population of the region remained relatively stable, increasing only about 16 percent during the 1960-1989 period, a much lower rate of growth than the national increase of 39 percent.
- **Retail business activity consolidated into larger establishments** which were most often located in higher level trade centers, the larger cities of the region. Larger discount shopping establishments became a major and growing factor across the region in the last half of the study period.
- **There was exceptional growth in the service sector** of the United States' economy, including the Upper Midwest. This new activity was found in all levels of trade centers, but it grew most in the region's larger cities and its four metropolitan areas.
- **Agriculture continued to consolidate its activities.** The number of farms and farmers in the region decreased during the 1959-1987 period by 37 percent as operations adopted new technology and as land ownership and capital were consolidated. At the same time, agricultural service industries tended to concentrate in larger cities as a result of changes in transportation and marketing.

All four of these trends contributed to the shift in the trade centers hierarchy, increasing the number and relative importance of higher level trade centers, while at the same time diminishing the importance—in some cases threatening the survival—of smaller towns and cities, especially those outside the rings of economic influence of the four metropolitan areas.

There were, however, four countervailing forces that tempered the larger, more powerful trends:

- **There was inertia against change** associated with the long-standing historical settlement patterns of the Upper Midwest. These patterns date back to the nineteenth century and the early exploitation of natural resources—fertile land for farming, vast acreages for ranching, abundant forests for lumbering, and rich mineral deposits for mining. The exis-

tence of well-established, smaller communities created an understandable lag in the shift of economic activity toward larger trade centers.

- **Agriculture remained strong,** despite its continuing consolidation. In their consolidated forms, farming and agribusiness continue to be essential elements in the economy of the region.
- **The forest products and mining industries remained important** to many towns and cities of the region, despite a general decline in other natural-resource-based economic activities. These industries provided sufficient economic activity to support some of the lower level trade centers.
- **Some new natural-resource-based activities emerged** during the period, including accelerated development of fossil fuels in the western Dakotas and eastern Montana and a burgeoning tourist industry located in various trade centers throughout the Upper Midwest, but particularly in portions of Minnesota, Montana, and Wisconsin. These gains have, in some cases, preserved towns and cities formerly reliant on farming, ranching, lumbering, and mining.

These findings raise several critical questions for the future of the region:

- **To what extent will the overall trend toward centralization of critical functions such as health care and education in larger trade centers continue nationally and in the Upper Midwest?**
- **If these trends continue, what will be the social and economic impact on the region, especially for trade centers at the bottom of the hierarchy?**
- **What new types of problems and opportunities will emerge in the higher level trade centers—metropolitan areas and regional centers-as they continue to grow and become more dominant in the region and increasingly provide services formerly found in smaller centers?**
- **Will an increasing number of smaller trade centers—hamlets and convenience centers—become places with limited functions and services where people simply reside? Will people in these small centers rely on larger cities for employment and important goods and services and expect their place of residence to supply only convenience goods and services?**
- **What will be the effect of increasing separation in rural economies between the farmer-rancher and the trade centers? How will local rural economies change as they rely less on farm trade?**
- **What will the extraordinary aging of the population in the smaller centers of the region mean to the continued successful operation of these centers as places to live, work, and do business?**
- **How many smaller trade centers will eventually lose their economic viability, even as places to reside, given their diminishing number of functions and services and the increasing maintenance costs of the existing infrastructure?**
- **Is it possible and desirable to develop policies aimed directly at offsetting these trends in order to slow future change in the region, thereby preserving and enhancing to some degree the older settlement patterns?**
- **Or, should policies be developed to minimize the impact of the larger trend or in other ways ease the transition for communities undergoing change, thereby facilitating an easier, more orderly transition for the people living there?**
- **Given the potency of the larger trend, what are the appropriate roles for public policies—in economic development, agriculture, transportation, and intergovernmental finance—either to accommodate or slow the transition currently underway?**
- **To what extent have changes already taken place that require a fundamental restructuring of how public and private goods and services are provided in the smaller centers and rural areas of the region?**
- **Finally, it is time to face squarely the question of the value the larger society places on the human resources in the region's smaller places and rural areas. Are their contributions to the fundamental strength of the states, the region, and the nation valued highly enough?**

While this report cannot and did not intend to answer fully these vital questions it has attempted to move the discussion in that direction and to provide a framework for deliberation about the region's future.

APPENDIX A: TECHNICAL PREPARATION OF THE DATA SET

Sources of Data

This study is based on Dun and Bradstreet (D&B) data collected and maintained as part of its nationwide credit services operations. The inclusivity of these data sets and D&B's collection procedures are discussed and described in Appendix B. This section seeks to explain—at a moderate level of detail—the data that we used and the procedures employed for reducing that data down to summary tables, charts, and the like. There were four main sources of data in this project.

1. 1989 Dun and Bradstreet Data Set

This file was comprised of numbers of business establishments by Standard Industrial Classification (SIC) code and zip code, including ranges showing "number of employees here." This data set was provided by D&B on a magnetic tape as part of a "Customized Information Systems" order, meaning that it was extracted specifically from their database files to service our request.

The data were summary only, individual business names were not included (Table A.1). A record existed for a zip code/SIC combination only when that zip code had one or more business establishments in that classification. The sample in Table A.1 shows a considerable incidence of "unavailable" in employment level ("employees here") data. This was generally the case and led us to avoid using these breakdowns for the most part. A tape including the Minnesota data was prepared by D&B and processed by our research team. When this proved workable, data for the remaining six states were received on one additional magnetic tape.

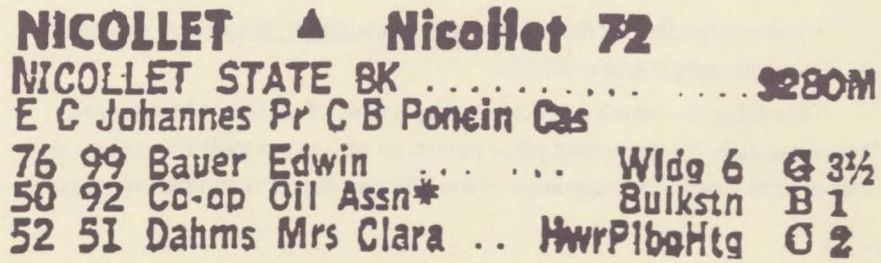
Table A.1 Format of 1989 Dun and Bradstreet Data–Actual Data Sample

			'employees here' -->								<-- 'employees here'
St.	Zip	SIC	1–4	5–9	10-19	20–49	50–99	100 –249	250 –499	500+	'unavail-able'
IA	50002	2711	0	1	0	0	0	0	0	0	0
IA	50002	3317	0	0	0	0	0	0	0	0	1
IA	50002	4212	0	0	0	0	0	0	0	0	1
IA	50002	4213	0	0	0	0	0	0	0	0	3
IA	50003	0115	1	0	0	0	0	0	0	0	1
IA	50003	0181	0	0	0	0	0	0	0	0	1

2. 1960 Dun and Bradstreet Data Set

This data set comes from the *Reference Book of Dun and Bradstreet*, a detailed tome listing of all D&B-covered businesses, dated January 1961. For a given place, this book lists all businesses (including depository institutions) individually by name, showing their associated SIC code, a code indicating line of business, credit codes, etc. (Figure A.1). For each of the seven study states, listings were individually keyed into computer files after zip codes were assigned by town or place location. (Assignment was necessary since zip codes were not in use at the time of the book's publication.)

Figure A.1 Sample from 1961 Dun and Bradstreet Book



With input data of this sort, there is no straightforward cross-footing or similar mechanism that ensures accurate transcription during the keying process. For each state's data, however, selected places (randomly chosen) were verified at the detail entry level. Results of these checks proved satisfactory.

The 1960 data were then transcribed onto diskette files (Table A.2). While the data are similar to the 1989 data, these 1960 data give details and are not summary in character: for a given zip code, the same SIC code might appear more than once. For example, SIC 5411—"grocery stores"—appears twice within zip code 59711.

Table A.2 1960 Data

Zip	SIC
59711	5411
59711	5813
59711	1511
59711	5411
59711	5621
59312	5411
59821	5612
59821	5411
59821	5411

3. 1989 Zip Codes and Population Data File

This data set was acquired from CACI, Inc. and—on a single computer diskette—provided place names for all zip codes in the seven state study area, as well as 1980 and 1989 population estimates (Table A.3). These were population "estimates" that:

- required transformations from the census tract level to zip code areas for the decennial census (1980). These transformations are part of the value added, which CACI is supplying with data files of this sort.
- were estimates for the ensuing years in addition, since there was no more recent census data available.

This data set—which is fundamentally a table of all Upper Midwest zip codes and their corresponding place names, as well as a population reference—was used as a basis for integration of the different data sets and data sources.

It should be noted that these are population estimates computed to zip code boundary areas, not those of incorporated city or town areas. As a result, for smaller places (say, less than 500 persons), these figures are often two or three times what might be expected. This is due to the considerable outlying area being included in the zip code, well beyond the city limits in small places. This effect diminishes as overall place size increases. Population figures for 1960 on the zip code level would have been a welcome addition to the study's data sources, but such numbers have not been developed since zip codes were introduced in the early 1960s.

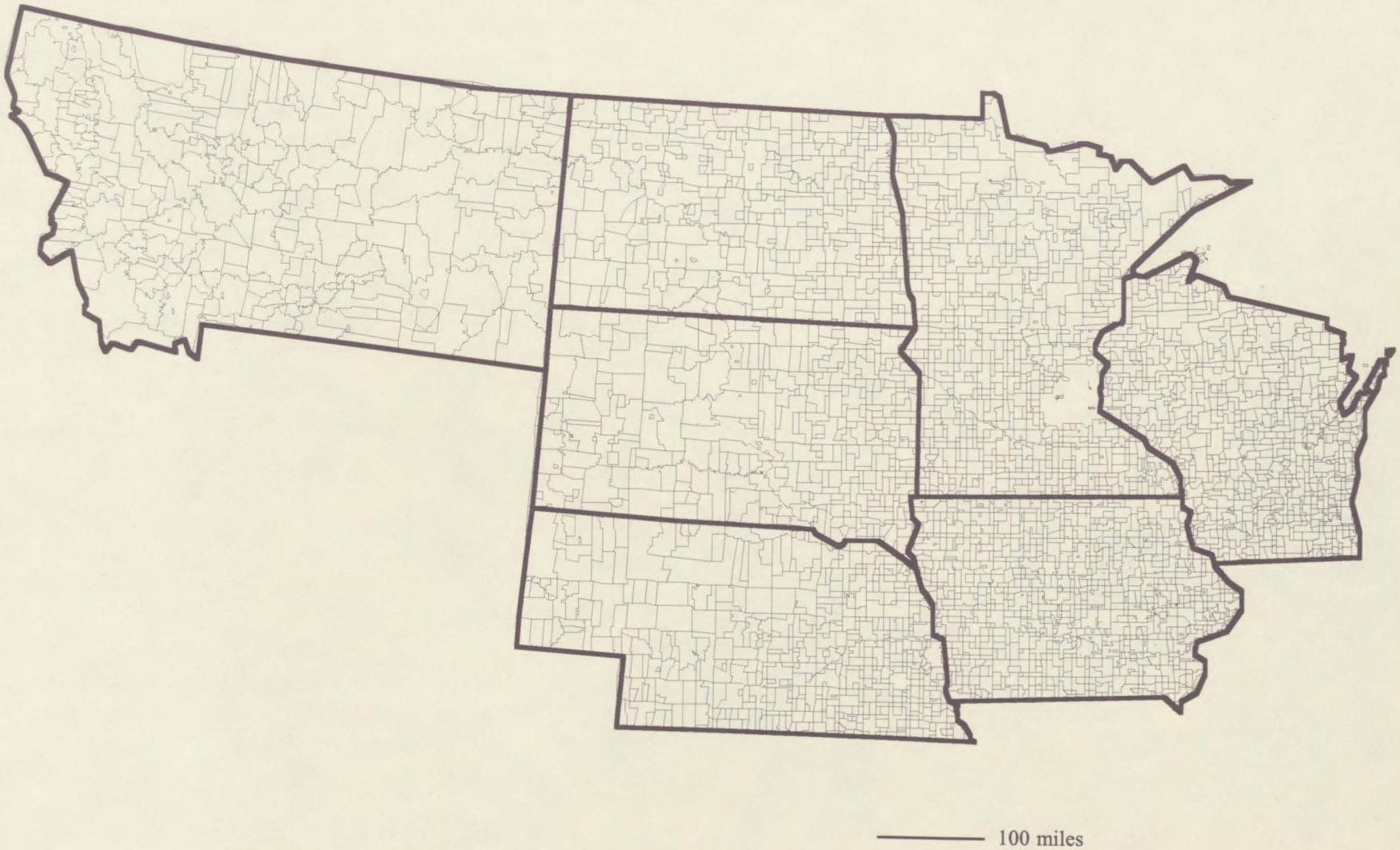
Table A.3 CACI Population by Zip Code Data Set

ZIP	STATE -CNTY (FIPS)	ST.	PO NAME	Pop. 1989
55601	27075	MN	Beaver Bay	49
55602	27137	MN	Brimson	1,074
55603	27075	MN	Finland	91
55604	27031	MN	Grand Marais	1,302
55605	27031	MN	Grand Portage	335
55606	27031	MN	Hovland	23

4. 1989 Zip Code Boundary Files

These data sets were obtained from Strategic Mapping, Inc. and consist of a series of latitude and longitude points describing each of the region's 4,000+ zip codes. Unlike county or city boundaries, zip codes show considerable volatility over time: new zips are constantly being invented and the extent of existing ones modified. Accordingly, a substantial amount of detail work was involved throughout the study in establishing geographical congruency between the various data sets. From these files we established an underlying grid pattern of zip code areas for the seven-state region (Figure A.2).

Figure A.2 Upper Midwest Zip Code Areas



Preliminary Processing Steps

All data were converted to standard ASCII diskette format and loaded onto a microcomputer. The dBase IV database program was used to accomplish all required manipulations at this phase of processing.

After a general analysis and comparison of the 1989 and 1960 D&B data, records for specific SIC codes were eliminated from both database files (Table A.4). Classifications were eliminated when comparable data simply were not available for the two study years; in most instances this meant that data were not collected in 1960. In addition, there were other odd instances where data could not be directly compared because of such things as modifications in classification methodology or unidentifiable SIC codes.

Table A.4 SICs Eliminated From This Study

SIC	Description
01xx	Commercial farms
02xx	Livestock
08xx	Forestry
09xx	Fisheries
10xx	Metal mining
12xx	Coal, lignite mining
13xx	Oil and natural gas
14xx	Other mining
19xx	Ordnance
21xx	Tobacco manufacturers
40xx	Railroad transportation
43xx	U.S. Postal Service
61xx	Non-depository institutions
62xx	Security and Commodity brokers
63xx	Insurance carriers
64xx	Insurance agents and brokers
67xx	Other investment offices
80xx	Medical, health services
81xx	Legal services
82xx	Educational services
83xx	Social services
84xx	Museums, etc.
86xx	Membership organizations
8700	Engineering, management services
8800	Private households
89xx	Miscellaneous services
9xxx	Public administration
9999	Non-classifiable establishments

The number of records deleted from the data sets as a result of this procedure was modest—but not insignificant—in terms of the whole. After the designated SIC code records were deleted, the number of zip code/SIC combinations for 1960 dropped from 108,000 to 106,000; the 1989 file went from 260,000 to 173,000. The total number of establishments dropped from 261,000 to 259,000 for the 1960 file and from 433,000 to 376,000 for the 1989 data set. The fact that the 1989 data set was reduced proportionally much more than the 1960 file is a reflection of the criteria used in the elimination process.

Next, the 1989 data were collapsed horizontally, eliminating all "numbers of employees" fields, and replacing them with a single "number of establishments" reflecting a count of firms in the given zip code for a specific SIC (Table A.5). Note that the "estabs" field contains the sum of all firms in that SIC for the given zip code.*

Table A.5 Collapsed 1989 Data Structure (same sample as in Table A.1)

St.	Zip	SIC	estabs
IA	**50002**	2711	1
IA	**50002**	3317	1
IA	**50002**	4212	1
IA	**50002**	4213	3
IA	**50003**	0115	2
IA	**50003**	0181	1

For the 1960 data, multiple appearances of the same SIC code (each appearance reflecting a particular establishment at the detail level) had to be aggregated. The output records of this process for each zip code were summary in nature—even when only one establishment was present for a SIC code in a zip code area.

At this point, the formats of the 1960 and 1989 data files were identical, meaning that Table A.5 describes both data sets in terms of file structure. The data in this form were used for the limited number of two-digit SIC code

* A limited amount of analysis was done regarding major employers in the study region--those with more than fifty employees at a site. That work involved using these files in their form prior to the reductive operations being outlined here.

analyses that were carried out as part of the study. This represents the lowest level of data with which we dealt throughout the remainder of the study.

When evaluated at the four-digit, three-digit, and even two-digit SIC level, there were too many data to permit reasonable analysis at the town and city level. Accordingly, data were aggregated within zip codes to reflect "industry categories," named groups of establishments for *ranges* of two-digit SIC codes. These groupings were selected as gauges for specific dimensions of local business activity (Table A.6). This process was carried out for both the 1960 and 1989 data sets.

Table A.6 Industry Categories and Their SICs

2-Digit SIC	"Industry Category"
07	Agricultural Services
16-18	Construction
20, 22-39	Manufacturing
41,42, 44-49	Communications/Transportation
50,51	Wholesale
52-59	Retail
60	Banks
65,71-73,75,76,78	Services

Using the population figures from the CACI data set, the 1989 data set (only) was supplemented with populations for each zip code area.

The next goal was to produce a definitive set of places (towns and cities) from the zip-code based data. For the vast majority of small and medium size communities, each place is associated with one and only one zip code. This correspondence does not hold true, however, for larger places. In order to accommodate this issue, an aggregated zip codes data set was built which had entries only for zip codes which were to be included with other zip codes (Table A.7). For example, Minneapolis might be serviced by seventy-five zip codes, but by means of this table all of its data values were consolidated into a single zip code record. It was not possible to break down any cities—even the largest,

Table A.7 Aggregated Zip Codes

ST.	ZIP	MULT -ZIP	PO NAME
IA	52200	52243	Iowa City
IA	52200	52244	Iowa City
IA	52200	52245	Iowa City
IA	52200	52246	Iowa City
IA	52400	52401	Cedar Rapids
IA	52400	52402	Cedar Rapids
IA	52400	52403	Cedar Rapids
IA	52400	52404	Cedar Rapids
IA	52400	52405	Cedar Rapids

such as Minneapolis or Omaha—into more than one zip code, since the 1960 data was necessarily all assigned to a single zip value for each larger place.

These tables were also used to consolidate data across state boundaries in a few instances: La Crescent, MN was included with La Crosse, WI; and East Grand Forks, MN with Grand Forks, ND, for example. There were six of these cases, and they were handled in this fashion so as to be consistent with the 1963 study.*

The result of these aggregations was two data sets, 1960 and 1989 "profile" data sets (Table A.8). Each held the same number of establishments (258,550 for 1960; 376,154 for 1989), but with a reduced number of places (roughly 4,000 compared with 4,600).

Pairing Zip Codes: 1989 and 1960

A single, combined data set was needed, with one set of data fields describing both 1960 and 1989 data, before evaluation of the system's twenty-nine-year change could begin. Using the 1989 data file as the basis for matching, routines were written to match and combine data by matching zip codes for places in the 1960 data set. This was an iterative and time-consuming process, necessitating "manual" examination of a number of places in the two files which had not been recognized at first as the same by the computer programs used. From the start, it

* Each of the steps described sounds simple and straightforward. In actual practice, however, such was not the case. Mismatches between places described by the boundary files, the CACI population and place name files, and the D&B data were pervasive. These disparities had to be researched carefully on an individual basis and then resolved in order to avoid further problems.

Table A.8 Profile Data Sets: 1960 (upper), 1989 (lower)

ST	ZIP	PO NAME	AC	AGS	Const	Manu	TrCo	Who	Ret	Banx	Srv	T_est
WI	**54020**	Osceola	1	0	5	3	4	2	36	1	11	62
WI	**54900**	Oshkosh	1	5	139	166	27	114	501	3	150	1105
WI	**54758**	Osseo	1	0	7	8	7	4	52	1	6	85
WI	**54460**	Owen	1	0	4	5	2	3	34	1	4	53
WI	**53952**	Oxford	1	0	2	1	1	1	17	1	2	25
WI	**53953**	Packwaukee	1	0	0	0	0	1	4	0	1	6

ST	ZIP	PO NAME	AC	AGS	Const	Manu	TrCo	Who	Ret	Banx	Srv	T_est	Pop89
WI	**54020**	Osceola	1	0	13	11	6	9	28	1	12	80	3,168
WI	**54900**	Oshkosh	1	9	172	174	68	128	493	12	327	1,383	63,179
WI	**54758**	Osseo	1	1	7	11	4	12	32	1	15	83	3,506
WI	**54460**	Owen	1	0	4	8	2	7	11	1	8	41	2,012
WI	**53952**	Oxford	1	2	10	2	5	4	14	1	9	47	1,895
WI	**53953**	Packwaukee	1	0	0	1	0	0	6	0	0	7	121

was evident that 100 percent congruence could not be achieved without an illogical amount of effort. Instead, the list of places which did not match was prioritized in order of descending population, and towns of significant size were researched and discrepancies resolved. The rest were dropped from the data set.

The single consolidated data file that resulted contained 3,991 zip-coded cities and towns (Table A.9). Remaining were 69 places (less than 2 percent of the files' zip codes), containing an average of 264 residents and less than .5 percent of the establishments. This level of unmatchables was deemed to be satisfactory.

Our approach does not attempt—nor is it intended—to deal comprehensively with the very smallest hamlets in the trade center hierarchy. As mentioned, most of the unmatchable places were small or very small towns. In addition, hamlets which lost their zip codes over the past twenty-five years were not available to match, since they were not in the 1989 data set as separate entities. Some towns were too small to be treated individually by D&B in their 1961 credit book; a portion of those probably have gone out of existence. The data used in this study are not the best for dealing with the disappearance of these very small towns. It is thus likely that the number of places we show at

Table A.9 Consolidated File Structure, on Completion of Matching Process

ZIP	PO NAME	AC	AGS '61	AGS '89	Const '61	Const '89	Manu '61	Manu '89	TrCo '61	TrCo '89	Who '61	Who '89	Ret '61	Ret '89	Banx '61	Banx '89	Srv '61	Srv '89	T_est '61	T_est '89	GC	POP89
55961	Ostrander	1	1	0	1	2	0	0	2	1	2	1	4	4	1	1	1	1	12	10	7	609
56077	Otisco	1	0	0	1	1	1	0	1	0	1	0	2	1	1	1	2	0	9	3	7	636
56571	Ottertail	1	1	2	0	8	1	2	0	2	2	3	6	13	0	1	3	8	13	39	7	1,088
56662	Outing	1	0	0	0	0	0	2	0	0	0	0	5	9	0	0	1	4	6	15	7	417
55060	Owatonna	1	3	5	33	97	35	69	10	36	31	59	159	186	2	4	44	142	317	598	3	23,546
56469	Palisade	1	0	1	1	3	2	0	2	2	1	2	8	4	0	0	1	3	15	15	7	1,222
56470	Park Rapids	1	1	2	14	42	15	28	2	10	12	23	96	118	3	3	39	84	182	310	4	8,279

the lowest level in the trade center hierarchy understates the actual number of settlements; similarly we understate the number of business establishments at this lowest level, though probably by a lesser degree. In either case, the effects are small, since the number of places at the bottom level (over 2,000 in 1989) is very large.

At this point—to facilitate data analysis and mapping—the data were moved to an Apple Macintosh computer where the Excel and MapMaker programs were used.

This was also the time to verify that the mapping process would be "successful" for this data set—that the zip code boundaries entered into the mapping system were congruent with the zip codes in our consolidated file. For each state there were a series of mismatches and other problems, especially since zip codes had been aggregated in so many instances. In addition, not all areas are actually assigned a zip code, so those places had to be double-checked as well. These issues were worked through to produce the 100 percent correspondence between data and mapping units which was needed.

Building and Scoring Places in the Trade Center Hierarchy

The original Borchert-Adams study* identified an eight-level trade center structure into which all cities, towns, and hamlets were classified. That study covered all of Minnesota, North Dakota, South Dakota, Montana, and a portion of Wisconsin. It was based on wholesale and retail trade statistics.

In trying to evaluate change throughout the system of places in the Upper Midwest, we sought to construct a model with our data that would reflect the original trade center breakdown established in the Borchert-Adams book. If such a model were effective, our plan was to:

- Use that model as a basis for evaluating places throughout the four states not in the 1960 study region and placing them within the hierarchy.
- Bring the model forward to 1989 and employ it to evaluate change in all seven states over the study's time period.

First, all places in the original full four-state study** were assigned their 1960 trade center class code (Table A.10). Then the average number of business establishments was computed for each industry category at each level in the trade center hierarchy (Table A.11, top half). In addition, standard deviation was calculated for each of these averages (Table A.11, bottom half).

Table A.10 Trade Center Class Levels

0	**Metro areas**
1	**Primary regional**
2	**Secondary regional**
3	**Complete shopping**
4	**Partial shopping**
5	**Full convenience**
6	**Minimum convenience**
7	**Hamlet**

Table A.11 1960 Averages and Standard Deviations for Minnesota, North Dakota, South Dakota, and Montana

TCC		AGS	Const	Manu	TrCo	Who	Ret	Banx	Srv	T_est
	count	*g_serv*	*constr*	*manu*	*com/tr*	*whole*	*retail*	*banx*	*serve*	*estabs*
Ave60>	*1051*	*0.2*	*3.6*	*1.9*	*1.4*	*4.0*	*20.2*	*0.5*	*5.0*	*36.8*
1	4.0	4.5	202.8	93.8	46.3	219.8	624.3	5.3	193.0	1381.0
2	7.0	1.6	97.4	53.7	29.4	88.3	351.9	3.6	98.9	724.7
3	29.0	1.3	28.9	14.8	9.4	26.0	130.9	2.1	37.1	250.6
4	45.0	0.5	9.5	4.5	3.7	8.6	58.4	1.2	14.7	101.2
5	46.0	0.5	6.0	2.8	2.6	5.5	40.2	1.0	10.1	68.8
6	162.0	0.2	2.7	1.6	1.4	2.9	21.1	0.9	4.7	35.7
7	758.0	0.0	0.4	0.3	0.4	1.1	6.1	0.2	1.1	9.6

TCC		AGS	Const	Manu	TrCo	Who	Ret	Banx	Srv	T_est
	count	*g_serv*	*constr*	*manu*	*com/tr*	*whole*	*retail*	*banx*	*serve*	*estabs*
SD60>	*1051*	*0.6*	*15.9*	*8.0*	*4.2*	*16.2*	*53.2*	*0.7*	*16.3*	*112.7*
1	4.0	3.1	36.8	25.4	7.6	49.4	79.6	1.5	53.9	228.4
2	7.0	1.1	29.9	15.6	6.8	23.3	74.6	0.5	29.0	147.6
3	29.0	1.5	14.9	10.3	4.4	13.7	44.8	0.5	17.6	99.1
4	45.0	0.6	4.8	2.7	2.2	3.4	12.4	0.4	5.6	25.5
5	46.0	0.8	3.5	1.4	1.9	2.4	7.2	0.4	3.6	13.4
6	162.0	0.5	2.0	1.6	1.3	1.7	6.9	0.3	2.9	12.1
7	758.0	0.1	0.9	0.9	0.7	1.2	5.4	0.4	1.9	9.1

* *Trade Centers and Trade Areas of the Upper Midwest*, Urban Report Number 3. Upper Midwest Economic Study, Minneapolis: Upper Midwest Research and Development Council, September 1963.

** Only part of Wisconsin was covered in the original study. Therefore, only Minnesota, North and South Dakota, and Montana were used in this averaging process: a total of 1,051 zip codes.

These averages and standard deviations were then used to evaluate places in the remaining three states for 1960—Wisconsin, Iowa, and Nebraska. Each city or town was assigned to the trade center class which best fit its profile of establishments. For each zip code:

- Its position in the trade center class structure was assumed to be level 1 (primary regional). The number of establishments it had in any given industry category (for example, wholesale) was compared with the average number of such firms for level 1 (Table A.11, upper half).
- If the number of firms was less than one standard deviation above or below level 1's average (Table A.11, lower half), a score of zero was assigned. If the number of firms was less than the average for level 1 minus the standard deviation, a score of -1 was assigned. Similarly, if the number of firms exceeded by more than one standard deviation the average number for this industry category, it was assigned a score of +1. This was done for each industry category plus the overall number of establishments in a place and the scores were summed (Table A.12). The maximum score was +9, the minimum score -9. If a place's profile was within a standard deviation of each industry category's average, then its overall (total) score would be 0.
- This process was repeated for the same place at lower levels in the trade center hierarchy (level 2—secondary regional, level 3—complete shopping, and so on). Its position in the 1960 trade center class hierarchy was determined by the level at which its score was closest to zero.

Table A.12 Scoring Matrix for New States in 1960

ST	ZIP	GC	PO NAME	ags	con	ma	com	wh	ret	ban	srv	est	tot
IA	**52001**	1	Dubuque	0	-1	0	-1	-1	0	0	-1	0	*-4*
IA	**51500**	1	Council Bluffs	0	-1	0	-1	-1	0	0	0	0	*-3*
IA	**52200**	2	Iowa City	1	0	-1	0	-1	-1	-1	0	-1	*-4*
IA	**50400**	2	Mason City	1	0	0	1	1	0	0	0	0	*3*
IA	**50158**	2	Marshalltown	0	-1	0	0	-1	-1	-1	0	-1	*-5*

For the 1989 model, all seven states were treated as a unit and trade center levels for each place were assumed to be unchanged from that of 1960. Averages and standard deviations for the region were calculated. These matrices were comparable to those computed for 1960 except that another category (population) was added (Table A.13).

The scoring of each place against the averages and standard deviations then proceeded in order by trade center class level: larger places (lower level numbers) were handled first. Within each of these levels, places were evaluated in order of descending population. Because of the extra category for 1989, the highest and lowest economic profile scores possible for a place were +10 and -10 (Table A.14).

Table A.13 1989 Averages and Standard Deviations for All Seven Upper Midwest States

TCC Ave89>	*count*	AGS *g_serv 1.0*	Const *constr 8.0*	Manu *manu 3.8*	TrCo *com/tr 3.6*	Who *whole 7.2*	Ret *retail 20.1*	Banx *banx 0.7*	Srv *serve 12.3*	T_est *estabs 56.6*	pop89 *pop89 2,088*
1	3	40.0	477.7	206.7	203.3	480.0	879.7	24.0	842.0	3154.0	105,524
2	13	13.2	203.3	86.7	76.0	147.0	455.8	8.3	331.9	1320.9	45,967
3	29	5.1	45.4	20.7	20.8	32.8	128.6	3.1	73.0	329.5	10,354
4	44	3.2	17.1	9.0	8.1	15.2	52.4	1.7	27.2	134.0	4,060
5	49	2.2	9.9	6.9	5.1	9.6	33.3	1.3	14.6	82.9	2,376
6	182	1.0	5.0	2.9	2.8	5.5	14.3	0.9	6.6	38.9	1,549
7	731	0.2	1.1	0.6	0.6	1.5	3.1	0.2	1.1	8.6	552

TCC SD89>	*count*	AGS *g_serv 3.0*	Const *constr 35.9*	Manu *manu 15.8*	TrCo *com/tr 14.7*	Who *whole 31.4*	Ret *retail 74.0*	Banx *banx 1.8*	Srv *serve 61.4*	T_est *estabs 235*	pop89 *pop89 8,042*
1	3	8.9	62.0	31.2	33.8	58.1	56.1	3.6	117.6	*295.4*	*10,646*
2	13	6.1	85.6	39.9	35.6	60.5	170.0	3.9	151.0	*523.5*	*21,109*
3	29	3.4	18.3	10.0	8.0	17.0	45.6	1.2	31.0	*119.3*	*4,231*
4	44	1.7	8.1	7.7	5.3	5.0	19.9	0.6	12.3	*47.3*	*2,235*
5	49	2.0	7.5	7.6	3.0	3.7	14.7	0.5	9.1	*37.7*	*1,391*
6	182	1.1	3.7	3.4	2.4	2.8	8.3	0.4	6.1	*19.8*	*979*
7	731	0.6	1.7	1.2	1.0	1.7	3.3	0.5	1.8	*8.1*	*622*

Table A.14 Scoring Matrix for 1989

ST	ZIP	'89 GC	PO NAME	ags	con	ma	com	wh	ret	ban	srv	est	pop	tot
IA	**52001**	**2**	Dubuque	0	0	0	0	0	0	1	0	0	1	*2*
IA	**51500**	**2**	Council Bluffs	0	0	0	0	0	0	1	0	0	1	*2*
IA	**52200**	**2**	Iowa City	0	0	0	0	0	0	0	0	0	1	*1*
IA	**50400**	**2**	Mason City	0	0	0	0	0	0	0	0	0	0	*0*
IA	**50158**	**2**	Marshalltown	-1	-1	0	0	0	0	0	0	0	0	*-2*

The scores were then evaluated to determine if a place had moved up or down the trade center hierarchy since 1960. For each zip code the following steps were taken:

- The overall 1989 score was examined. If its absolute value was less than 7, the trade center class was left unchanged from its 1960 value. For example, this was the case with Iowa City (Figure A.16), where its overall score was +1: it was still a member of trade center class 2 (secondary regional), but was healthier within this group than it had been in 1960 (Table A.12).
- If the overall 1989 score was +7 or higher, then the trade center level for that place was moved up one level (to the next lowest numeric value). For example, if a city's economic profile were +8 and it had been a partial shopping center (trade center level 4) in 1960, scoring would be tried for it as a complete shopping center (level 3). When this proposed change was made, averages and standard deviations for groups 3 and 4 were recalculated to reflect it. This recalculation was important at levels 2, 3, and 4 in the hierarchy, where the movement of one city to another level could have a large effect on the averages and standard deviations—and thus on the resulting scores. If the absolute value of a place's score resulting from this process was lower than its score calculated at its old trade center level, then it was assumed to have "moved up" in the trade center hierarchy; otherwise its level was assumed to be unchanged.

If the resulting score was still greater than 7, the process was repeated, although in only a few cases did a city or town merit moving up more than one level in the trade center hierarchy.

- If a place's score was -7 or lower, then the trade center level for that place was moved down (to the next highest numeric value) and the procedure described above was followed. For example, Dubuque, Iowa was moved down the trade center hierarchy (Tables A.12 and A.14). It was a weak primary regional center in 1960, with a score of -4 (Table A.12). In 1989 it was classified as an average secondary regional place, with a score of 2 (Table A.14).

The overall result of these procedures was a data set detailing for each zip code place its position within the trade center hierarchy, both in 1960 and 1989. This data set was the basis for further analyses, through the tables, charts, and maps that appear in the body of this report.

APPENDIX B: ASSESSING THE DUN AND BRADSTREET DATA

Dun and Bradstreet Corporation (D&B) collects data on the number of firms, their respective employment levels, and their financial health, among other variables, at the zip code level. In order to be included by D&B a firm must be in the credit system. These data are bought mainly by businesses that are concerned with the credit worthiness of a particular firm. It is gathered primarily by telephone, though in some cases direct fieldwork is used. The method of collection has been modified since 1960 when standard operating procedure was to send people out door-to-door. The main pieces of data we used for our study were the count of firms by zip code area and their industry classifications.

D&B classifies each firm by its Standard Industrial Classification (SIC). Classification becomes problematic when there are two or more distinct operations at the same establishment. A service station with a "quick stop" shop is an example. In this circumstance, the establishment is classified according to the part of the business which generates the greater dollar volume. This situation was not a cause for concern in this study since we aggregated all retail data; both the service station and the "quick stop" are grouped as retail establishments. In the case of a hotel with a lounge and restaurant, all owned by the same company, volume again determines classification. Franchises generally are classified as separate establishments whereas branch firms are considered part of the parent firm.

Excluded Data

We examined the data excluded from this study (Table B.1) in order to assess the validity of our methodology (see Appendix A for further explanation of the methodology). We compared the distribution of the data excluded and the data

Table B.1 Data Excluded from This Study

SIC	Description
01xx	Commercial farms
02xx	Livestock
08xx	Forestry
09xx	Fisheries
10xx	Metal mining
12xx	Coal, lignite mining
13xx	Oil and natural gas
14xx	Other mining
19xx	Ordnance
21xx	Tobacco manufacturers
40xx	Railroad transportation
43xx	U.S. Postal Service
61xx	Non-depository institutions
62xx	Security and Commodity brokers
63xx	Insurance carriers
64xx	Insurance agents and brokers
67xx	Other investment offices
80xx	Medical, health services
81xx	Legal services
82xx	Educational services
83xx	Social services
84xx	Museums, etc.
86xx	Membership organizations
8700	Engineering, management services
8800	Private households
89xx	Miscellaneous services
9xxx	Public administration
9999	Non-classifiable establishments

included across trade center classes and we examined selected SIC codes, those that contained most of the excluded data. Data were excluded for two reasons. First, because D&B did not collect certain data in 1960. This was particularly true in the service industry. Had we included the 1989 data when all 1960 data were missing, we would have been overestimating the change in the past thirty years. Knowing from our study that the services we analyzed have experienced phenomenal growth, especially at the higher trade center levels, and knowing that many of the health, legal, and social services excluded from our study have also had tremendous growth over the same period, our report, in fact, underestimates the change that has occurred. Second, data were excluded because they could not be directly compared due to modifications in classification methodology.

Looking at the distributions of the data included and excluded from our study (Table B.2) one finds that they are similar, if not congruent, at all levels. Discrepancy at the lower levels, primarily the hamlets, is due mainly to the high number of farms in these places; the majority of the agricultural production establishments excluded—commercial farms and livestock growers—are located in the lower level centers of the hierarchy.

The largest part of the data excluded were service establishments (Table B.3). At least half were services in all states. In both Minnesota and Wisconsin, services accounted for approximately 80 percent of the total. This underscores the prevalence of health, legal, and social services in the larger places of the Upper Midwest, particularly the two dominant metropolitan centers of Minneapolis-St. Paul and Milwaukee. Overall, agricultural products; services in health, legal, educational, and social services; and other services (these are finance and insurance) account for over 95 percent of the data excluded in every state with two exceptions: Montana and North Dakota. In both these states oil and gas extraction establishments (SIC 13) make up most of the difference (8 percent in Montana and 10 percent in North Dakota).

Data Comparability

No data set is perfect. Each source has its strengths, either in its unit of analysis, in its coverage, or in its detail. One of the main benefits of D&B data is that it is one of the few extensive sources that is available at the zip code level. This feature allows for a much finer analysis at the micro-level. In terms of coverage, D&B only lists firms that are in the credit system. The *County Business*

Table B.2 Distribution of Data Excluded and Included in this Study, by Trade Center Class, 1989

	0 Metro Areas	1 Primary Regional	2 Secondary Regional	3 Complete Shopping	4 Partial Shopping	5 Full Convenience	6 Minimum Convenience	7 Hamlet	Total
Data Included:									
Number of Businesses	95,345	40,349	62,051	55,983	38,402	27,845	36,650	19,534	376,159
Percent	25%	11%	16%	15%	10%	7%	10%	5%	100%
Data Excluded:									
Number of Businesses	15,055	5,262	8,020	7,327	5,563	4,266	6,372	4,941	56,806
Percent	27%	9%	14%	13%	10%	8%	11%	9%	100%
Wisconsin	3,472	2,504	2,442	2,310	1,284	943	1,133	300	14,388
Minnesota	8,012	353	1,050	1,399	1,156	682	1,116	788	14,556
Iowa	1,654	1,001	1,647	1,553	1,321	1,029	1,293	553	10,051
North Dakota	•	334	828	383	186	234	411	594	2,970
South Dakota	•	166	226	407	330	253	696	851	2,929
Montana	•	615	1,330	754	504	363	474	793	4,833
Nebraska	1,917	289	497	521	782	762	1,249	1,062	7,079

Table B.3 Percentage of Data Excluded that Falls in Selected SIC Codes

SIC	Health, Education, Legal, and Social Services 80-89	All Other Services 61-64,66-67	Ag. Production-Crops & Livestock 01, 02	*Total*
WI	54	27	17	98
MN	54	26	18	98
IA	40	26	32	98
ND*	33	24	31	88
SD	38	23	35	96
NE	37	24	35	96
MT**	36	17	32	85

* ND has 10% in SIC 13 (Oil and Gas Extraction)
** MT has 8% in SIC 13 (Oil and Gas Extraction)

Patterns data have wide coverage and are collected every five years and compiled at the county level. Sales tax data record who has registered for a sales tax license. Some people may acquire a license and never use it, or use it only for a short period of time.

Chamber of Commerce data for individual cities are specific but have limitations because chambers are membership organizations; their coverage of business establishments varies depending on the individual chamber's penetration into the local business community. State directories for particular industries are another data source. For example, the *Minnesota Directory of Manufacturers* contains a list of all manufacturing firms in the state plus their addresses and the names of their chief executive officers. The directory is updated annually.

Deciding which data source to use depends largely on the aims of the study and the level of detail needed. What follows is a comparison of the D&B data used in this study with the sources mentioned above. Clearly, no single data source presents the "Truth." The analysis here seeks to provide an increased understanding of the D&B data set.

County Business Patterns

A comparison of D&B data from 1989 with County Business Patterns (CBP) data from 1987 was made for each state by major industrial categories (Table B.4). CBP data are collected by major industry groups every five years. In three categories—manufactures, wholesale, and retail—D&B's counts are higher in every state. One explanation may be the difference between years, 1987 and 1989. The larger CBP file for service establishments was expected since a number of service categories were deleted from our data, as noted earlier. In comparing the totals from all industry categories, the difference between the two data sets is small: 8 percent. In the aggregate, then, the CBP data and the D&B data are very similar.

Table B.4 Comparison of Dun and Bradstreet Data (1989) with *County Business Patterns* Data (1987): Number of Establishments Listed

	Manufactures		**Wholesale**		**Retail**		**Services**		***Total***	
	D&B	CBP	D&B	CBP	D&B	CBP	D&B	CBP	D&B	CBP
WI	12,042	9,212	11,778	8,773	36,435	32,352	24,417	36,522	108,148	116,915
MN	10,805	7,179	12,917	9,453	29,803	27,069	25,251	34,844	101,534	106,378
IA	4,964	3,579	8,949	6,970	22,915	20,229	13,672	22,641	66,269	71,535
ND	884	630	2,696	2,046	5,969	5,290	3,450	5,503	17,077	19,076
SD	1,125	778	2,300	1,800	6,415	5,442	3,613	6,072	17,711	19,577
NE	2,654	1,885	5,373	3,920	12,952	11,593	9,029	13,403	40,667	42,691
MT	2,009	1,245	2,575	1,797	8,735	6,859	5,820	8,107	24,753	25,080
Region	***9,627***	***6,872***	***19,318***	***14,736***	***48,251***	***42,554***	***29,764***	***47,619***	***141,724***	***152,879***

Source: U.S. Department of Commerce, Bureau of the Census, County Business Patterns 1987, pp. 1-2, Table 1a.

Sales Tax Data

An active sales tax listing for Iowa was compared with the D&B data for 1989. This comparison took two forms: a site visit was made to three towns in Iowa (Blairsburg, Jewell, and Kamrar) in March 1990 and data were compared for a sampling of two-digit SIC codes for twelve places in Iowa. The site visit allowed both D&B listings and sales tax listings to be compared with a real life count of the businesses observed in these towns. Businesses were categorized into three groups: mainstream businesses, home businesses (those operating out of the home, often retail or service-related), and businesses that no longer existed (because the owner had moved, died, or retired). Comparing only mainstream businesses one finds that both the sales tax and D&B data sets under count (Figure B.1). Sales tax data include more of the mainstream businesses than D&B in these three towns, but also include more home and non-existent businesses. The choice, then, between these two sets of data involves a tradeoff: more mainstream businesses and more home businesses and non-existent businesses or fewer of all three types of businesses.

The inclusion of home businesses is an interesting question for our study of economic change in the Upper Midwest. Many home businesses are service related, small in their operations and volume, and often on the margin in terms of economic activity. Futhermore, these businesses experience great fluctuations and have difficulty withstanding wide scale economic change. Including home businesses in this study would overestimate their impact on the economic structure of the region. The inclusion of these businesses and less stable operations in the sales tax data is further reflected in the comparison of nine two-digit

Figure B.1 Comparison of Dun and Bradstreet Data (1989) with Sales Tax Data (1989) and a Site Visit (1990) for Three Towns in Iowa

SIC codes in twelve places in north-central Iowa (Table B.5). Counts in the sales tax data are higher in most categories, particularly miscellaneous retail and personal services. Personal services are often business establishments that operate out of the home—a hair stylist or a residential cleaning service, for example. Miscellaneous retail includes drugstores, used merchandise stores, book stores, jewelry stores, and mail order retailers.

Chamber of Commerce Data

Membership directories for the Chambers of Commerce in two Minnesota communities—Alexandria and Willmar—were compared with the D&B data (Table B.6). The data were categorized according to the industry categories used in this study. Health care, amusement facilities, and educational institutions were excluded from the analysis. The chambers' information is limited in

Table B.5 Comparison of Dun and Bradstreet Data (1989) with Sales Tax Data (1989) for Selected SIC Codes for Twelve Places in Iowa

Trade Center Class		*Fort Dodge* 2	*Webster City* 3	*Clarion* 4	*Pocahontas* 4	*Manson* 5	*Jewell* 5	*Gilmore City* 6	*Farnhamville* 6	*Dakota City* 7	*Blairsburg* 7	*Hardy* 7	*Kamrar* 7
Description	**SIC**												
Special Trade Contractors	**17**	11	-2	-9	1	-1	1	-2	-2	-2	1	-	-2
Trucking and Warehousing	**42**	36	8	2	3	5	-	1	2	1	1	-1	-
Wholesale Trade-Durable Gds	**50**	-29	-10	-7	-4	-7	-3	-	-1	0	-	-2	-1
Eating and Drinking	**58**	-26	-9	-9	-1	-2	-4	-2	-2	-6	2	-1	1
Misc. Retail	**59**	-195	-67	-21	-15	-22	-13	-11	-3	-3	-6	-2	-1
Real Estate	**65**	46	6	3	2	1	-	-	-	-	-	-	-
Personal Services	**72**	-80	-32	-18	-12	-12	-9	-5	-3	-5	-2	-	-2
Auto Repair, Services	**75**	-39	-18	-10	-2	-4	-2	0	-2	-4	-1	-	-1
Misc. Repair Services	**76**	-55	-8	-9	-6	-8	-1	-4	-2	-2	-3	-1	-1

Each entry is difference when sales tax data are subtracted from Dun and Bradstreet data
(-) no listing in either D&B or sales tax data

Table B.6 Comparison of Dun and Bradstreet Data (1989) with Chamber of Commerce Data (1989)

Alexandria:	D&B	C of C	% Diff
Ag Servs	6	5	17
Construction	101	33	67
Manufactures	51	19	63
Trans./Comm.	29	10	66
Wholesale	49	7	86
Retail	241	115	52
Banks	3	9	-200
Services	157	86	45
Total	637	284	55

Willmar:	D&B	C of C	% Diff
Ag Servs	12	3	75
Construction	62	17	73
Manufactures	38	11	71
Trans./Comm.	31	15	52
Wholesale	71	16	77
Retail	237	139	41
Banks	4	5	-25
Services	130	69	47
Total	585	275	53

Sources: Alexandria Chamber of Commerce Membership Directory, 1989 and Willmar Chamber of Commerce Membership Directory, 1989

that it is a membership organization and a number of businesses in the community do not join. According to the individual chambers' assessment, Alexandria has approximately three quarters of the local business establishments and Willmar has less than half. Major businesses, in terms of volume and employment, tend to be members, whereas home businesses and many of the smaller service and retail establishments are not. This membership factor explains most of the differences between these two data sources. The unit of analysis is another factor in the differences. The D&B data are by zip code, so that in Alexandria, for example, the data also include the rest of the 55308 zip code area. Chamber of Commerce membership lists are mainly for establishments located within the city boundaries of Alexandria. Both Alexandria's zip code area and Willmar's zip code area (56201) encompass areas that are much larger than the city itself.

State Industrial Directories

Finally, we compared the *Minnesota Directory of Manufacturers* with the D&B data. This directory is compiled by National Information Systems and is extensive in its coverage. It is based on a formal survey conducted in 1977, and updated annually through a mail survey followed by phone calls to manufacturers. For the comparison, we randomly chose nineteen of the larger, non-metropolitan places in Minnesota (Table B.7). The discrepancy between the two sets of numbers results partially from the unit of analysis. As with Chamber of Commerce data, the manufacturers' directory list firms within city boundaries. In some cases zip code areas are small and the city has the bulk of the establishments. In other instances zip code areas are large and include business establishments outside of the city's boarders or in other towns in the zip code area.

Table B.7 Comparison of Dun and Bradstreet Data (1989) with *Minnesota Directory of Manufacturers* Data (1989)

	D&B	Directory	% diff
Albert Lea	50	63	-26
Alexandria	51	36	29
Austin	28	41	-46
Bemidji	41	47	-15
Brainerd	48	47	2
Chisholm	11	13	-18
Faribault	46	47	-2
Fergus Falls	45	48	-7
Hibbing	35	39	-11
Mankato	122	105	14
Northfield	27	16	41
Owatonna	69	55	20
Park Rapids	28	23	18
Red Wing	32	27	16
Redwood Falls	20	15	25
Rochester	105	81	23
St. Cloud	143	110	23
Willmar	38	53	-39
Winona	103	111	-8

Source: Minnesota Directory of Manufacturers, 1989
National Information Systems, 1989

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